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ARMY COMMUNICATOR

Voice of the Signal Regiment

160 Years of Signal

Contents

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Opinions expressed herein do not necessarily reflect the views of Office, Chief of Signal, the US Army or the Department of Defense.

Submit articles, photos, graphics, videos, story ideas, and nominations for "Signal Spotlight" to the editor here. For additional information, please call (706) 791-7384.
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Chief of Signal

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CW5 Garth R. Hahn
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On the Cover

This month, the United States Signal Corps celebrates 160 years of, "Getting the Message Through!" All historical photos in the issue courtesy of Signal History Office and Army Communicator Archives.

Chief of Signal Regimental Team

Welcome back to another edition of the Communicator. The team and I hope you all are staying safe during this time and are excited to get back into our new “normal” routine. It is important we remain vigilant through this pandemic and continue utilizing the recommended safety precautions. This is not the time to become complacent but rather to stay mindful. We need each and every one of you healthy and in the fight.

This month is a very special one; not only does the Signal Regiment turn 160 years old, we are also welcoming new team members into the Signal School leadership. The Signal Corps has always been vital to military operations. We are the link that keeps everything up and running. June 21, 1860, our history began with Albert James Myer. He proposed a simple idea for communication that has flourished into networking, cloud computing, and beyond line of sight capabilities. Our role as Communicators is to provide our forces the ability to exchange information through voice and digital means. We deliver the pipeline that gives commanders the ability to convey their thoughts, intentions, and objectives. Without the Signal Corps, combat effectiveness would be greatly diminished. The work you do every single day does not go unnoticed or unappreciated. Every infantryman, tanker, and artillery Soldier relies on you to accomplish their mission. While you may not hear “Thank you” very often, know you are indispensable.

This month also marks another important transition for the Signal School. Command Sgt. Maj. Knott and I are honored to announce the new Signal School Command Sgt. Maj. Darien Lawshea. I have no doubt he will continue the positive momentum of the Regiment. Both Command Sgt. Maj. Knott and I are grateful for the opportunity to make a difference throughout the Regiment over the last two years. Please remember, the Signal School is here and works for you every single day. Never hesitate to reach out with questions or comments. Thank you for all you do!

Don’t forget, we want to see what you are doing to keep training throughout this time. If you’d like to submit comments, photos, or have an idea for an article to be featured in next month’s edition, please contact us.

BG Christopher Eubank
Chief of Signal

CSM Richard Knott
Regimental CSM

CW5 Garth Hahn
Regimental CWO

Distinguished Members of the Regiment

Since Regimental activation, the Signal Regiment has had a program for recognizing people who have made a special contribution or who have distinguished themselves in service to the Regiment. Distinguished Members of the Regiment are prestigious or notable military or civilian persons who are recognized for their accomplishments. They must be current or former members of the Signal Corps Regiment. Nominees may be active, U.S. Army Reserve, Army National Guard or Signal Regiment Department of the Army civilians (active or retired status).

The designation as a Distinguished Member of the Regiment is largely ceremonial and serves to perpetuate the history and traditions of the Regiment, thereby enhancing unit morale and esprit. Here are to 2020 Inductees:

Lt. Gen. (ret.) Steven W. Boutelle

Lt. Gen. (ret.) Steven W. Boutelle graduated from Wilson High School in 1966 and enlisted in the Army in 1969. He underwent basic at Fort Lewis, and as a result of superb scores on Army entrance examinations, was slotted for training as a nuclear weapons electronics specialist. Moreover, Boutelle's superiors marked him as officer material, and within months he enrolled in Officer Candidate School. In February 1970, Boutelle earned his commission as a second lieutenant in the Signal Corps. After several tours of duty as a platoon leader in infantry and artillery battalions in Germany, he returned to Fort Lewis as commander of B Company, 58th Signal Battalion.

Lt. Gen. (ret.) Steven W. Boutelle

During the presidential administration of George H.W. Bush, Boutelle served as chief test and evaluation officer and executive officer of the Army's Command System Integration Agency. He later worked as a war theater planner for the Joint Chiefs of Staff.

During the Bill Clinton administration, Boutelle served in several leadership positions instrumental to national defense, including service as project manager for the Army's Field Artillery Tactical Data Systems, as well as program executive officer for the Army's Task Force XI and Command, Control, and Communications Systems.

By the fall of 2001, Boutelle worked for the Army's Chief Information Officer (CIO) at the Pentagon as director for Information Operations, Networks, and Space. After the September 11, 2001 terrorist attacks, Boutelle was sent to Southwest Asia where he helped establish and coordinate command and control communications systems for American combat operations in Afghanistan. His focus soon shifted to the immense battle communications challenges related to the war in Iraq. In 2003, Boutelle was named CIO of the Army, responsible for com-

munication technology personnel stationed around the globe.

Lt. Gen. Boutelle retired in 2008 and currently resides in Alexandria, Va. with his wife, Tracy. He has continued serving the military from within the private sector. He served as a vice president in Cisco Systems' Global Government Solutions Group, charged with building a new unit within the company to establish internet routing using commercial satellites. He serves on the Defense Science Board Task Force for Interoperability and sits on the boards of PacStar Communications and ThreatMatrix. He is also an established public speaker, having delivered keynote addresses at the 2014 and 2015 World Economic Forums in Geneva and Jordan as well as the Berlin Security Conference in 2016.

Lt. Gen. (ret.) Robert S. Ferrell

Lt. Gen. (ret.) Robert S. Ferrell, a native of Anniston, Ala., enlisted in the Army and advanced to the rank of sergeant before completing his undergraduate degree and receiving a commission as a Signal Corps officer. He later earned a Master of Science degree in Administration from Central Michigan University and a Master of Science degree in Strategy from the Army War College.

During his career, Ferrell has served in Army units in the United States, Korea, and throughout Europe, and has been deployed to Bosnia and Iraq. His principal staff assignments have been as Operations Officer and Communications-Electronics Officer, Second Battalion, Seventh Special Forces Group (Airborne); Captain Assignments Officer, Signal Branch Army Personnel Command; Aide-de-camp to the Secretary of the Army; Assistant Division Signal Officer, 82nd Airborne Division; Executive Officer, 82nd Signal Battalion; Operations Officer, Seventh Signal Brigade, Fifth Signal Command and Aide-de-camp to the Commanding General, V Corps, United States Army Europe and Seventh Army, Germany; Military Assistant to the Executive Secretary, Office of the Secretary of Defense; Military Assistant to the Director, Program Management Office, Coalition Provisional Authority, Operation Iraqi Freedom; Chief, Programs Division, Office of the Chief of Legislative Liaison; Army Senior Fellow, Council of Foreign Relations, New York; Director, Army Modernization, Strategic Communication, Army Capabilities Integration Center-Forward, Army Training and Doctrine Command; and Director for C4 (command, control, communications, and computers) Systems, Africa Command.

Lt. Gen. (ret.) Robert S. Ferrell

He commanded A Company, 426th Signal Battalion, 35th Signal Brigade, XVIII Airborne Corps; 13th Signal Battalion, First Calvary Division and Operation Joint Forge, Tuzla; Second Signal Brigade, Fifth Signal Command, United States Army Europe and Seventh Army, Germany; and Communications-Electronics Command, Aberdeen Proving Ground.

On December 23, 2013, Ferrell became the Army CIO/G6 where he reported directly to the Secretary of the Army, setting strategic direction and objectives for the Army network and supervised all Army C4 and Information Technology (IT) functions. He oversaw the Army's $10 billion IT investments, managed Enterprise IT architecture, established and enforced IT policies, and directed delivery of op-

Col. (ret.) Brenda F. Crutchfied

erational C4 IT capabilities to support warfighters and business users. As the G6, he advised the Chief of Staff of the Army on network, communications, signal operations, information security, force structure, and equipping.

Col. (ret.) Brenda F. Crutchfied

Col. (ret.) Brenda F. Crutchfied has served in the United States Army and the Signal Corps and the Signal Regiment with distinction for the past 36 years, including 26 years of active duty service.

She served more than two decades in the Army in varying positions of increased responsibility including Platoon Leader in the 440th Signal Battalion, Darmstadt, Germany; Company Commander and Battalion Operations Officer in the 25th Signal Battalion, Fort Bragg, NC; Staff Officer in the First Signal Brigade, Korea; Executive Officer for Transportation Command, Scott Air Force Base, Il.; and Battalion Executive Officer and Brigade Chief of Staff, again at Fort Bragg. In 1997, Crutchfield became the first woman to assume command of the 121st Signal Battalion, First Infantry Division. While deployed to Tuzla, Boznia-Herzegovina, her battalion provided tactical communications support to Multi-National Division North organizations including elements of the Russian and Turkish brigades.

Following retirement from the Army in 2005, Crutchfield served as a program manager for a defense contractor, first supporting Army Knowledge Online, and then supporting the Army CIO/G6. In September 2009, after serving four years as a defense contractor, she returned to civil service as a Department of the Army civilian, serving as Deputy Director of the Army Global Network Operations and Security Center; Deputy Director of the G36 Compliance Division, NETCOM /9th Army Signal Command; and as Deputy Director of Future Operations, Army Cyber Command. Her relentless efforts in each of these positions earned her and her teammates accolades from various organizations. In 2012, she received the Blacks in Government Meritorious Service Award and in 2017, was part of the Army team recognized by the Department of Defense Chief Information Officer for outstanding contributions to the DOD IT environment in leading the Army's implementation of the DOD Cyber Security Scorecard. Also in 2017, Crutchfield was inducted into the North Carolina State University Computer Science Hall of Fame.

Col. (ret.) Stanley L. Evans

Col. (ret.) Stanley L. Evans

Col. (ret.) Stanley L. Evans, a native of Oklahoma City, started his military career as an enlisted Air Defense soldier in 1968. During his first assignment, he was selected for Officer Candi-

date School at Fort Sill, Okla., graduating in March of 1970. He was commissioned Signal and assigned to the 82nd Airborne Division for his initial officer assignment as a Signal Platoon Leader, and later as the Battalion Signal Officer of 2/321 Arty (Airborne). This assignment was followed by a tour in Vietnam, where he served as a platoon leader, and Commander in the 39th Signal Battalion, First Signal Brigade.

Over the next 30 years, Evans distinguished himself while serving in numerous command and leadership positions of great responsibility, culminating a distinguished military career as the Dean of Students and Administration at the U.S. Army Command and General Staff College, Fort Leavenworth, Kan. and prior to that as a leader, trainer, and commander in the Signal Corps. He also contributed significantly to the education of the core of Army officer leadership. As the Dean of the Students and Administration of the Army's premier organizational leadership school with a resident enrollment of 5,700 students yearly and 11,000 (distance learning) students from March 1997 through February 2000, he managed the daily operations, logistics, personnel, and budgetary resources of the institution.

CW5 (ret.) Edward E. Johnson

Evans made a significant contribution to the U.S. Army Signal Corps. As the Signal Regimental Director of Training and Director of the Office of the Chief of Signal (OCOS), at the Army Signal Center, Fort Gordon, Ga., from 1992 – 1995, he managed the daily training for over 19,000 telecommunications, automation, and electronic maintenance soldiers and officers yearly. Supervising five schools, teaching over 60 job patterns, he directly oversaw the design and implementation of the most sweeping change in the Army's telecommunications training ever. This effort changed the career patterns of 52,000 Active and Reserve Soldiers. It integrated automation and computer support skills into the Army telecommunications training programs, created the MOS 72B, and implemented the MOS 31U concept.

Upon retirement, Evans returned to Oklahoma, went to law school at the University of Oklahoma, received his law degree, and served as the Dean of Students for the Law College. He has also served as the Chair of the State of Oklahoma Human Rights Commission.

CW5 (ret.) Edward E. Johnson

CW5 (ret.) Edward E. Johnson served the United States Army with distinction for over 32 years. Born in Westminster, SC. He entered the Army in 1985 as a Wire Systems Operator (MOS 36M). From 1986-1993 he served in the 57th Signal Battalion, Fort Hood, Tex. From 1993-1995 he was assigned to 154th Signal Battalion Fort Clayton, Republic of Panama as Switching Systems Supervisor. In 1995, he was selected to attend the Warrant Officer Candidate School (WOCS) and was appointed WO1 in the Signal Corps.

After completing the Signal Warrant Officer Basic Course, Johnson was as-

signed to the S3 (Operations) 13th Signal Battalion, First Calvary Division as the Battalion Network Technician. In 1999, he was assigned to the First Signal Brigade, Seoul South Korea as the OIC of the US Forces Korea Commander-in-Chief Communications Support Team. In 2002, he was assigned to the Joint Communications Support Element, MacDill Air Force Base, Fla. as the Operations Network Technician J3 and J5 Directorate as the Chief of Test and Evaluation Branch. In 2007, Johnson was assigned as the OIC, ISAF Commander's Communications Team, Kabul Afghanistan. In 2011, he was assigned as the Senior Technical Advisor, Capabilities Development Integration Directorate, Fort Gordon, Ga. In 2013, Johnson returned to the Joint Communications Support Element Command Group, as the Element's first Command Senior Warrant Officer. His final active duty assignment was as the Chief Engineer, J6 United States Special Operations Command, MacDill AFB from 2015-2017.

Johnson's combat/ operational assignments consist of Desert Shield/Desert Storm (Saudi Arabia/Iraq) 1990-1991; Operation Joint Forge (Bosnia-Herzegovina) 1998-1999; Operation Iraqi Freedom 2005 and 2008; Operation Enduring Freedom (Afghanistan) 2007-2008; 2009 Operation Unified Response 2010 (Haiti). Some of his awards and decorations include the Legion of Merit, Bronze Star Medal, Defense Meritorious Service Medal (2OLC) Meritorious Service Medal (3OLC), Joint Service Commendation Medal; Army Commendation Medal (3OLC); Joint Service Achievement Medal (1OLC); Army Achievement Medal (7OLC); Basic Airborne Parachutes Badge and the Air Assault Badge; German and Italian Foreign Jump Wings and is a Silver and Bronze Order of Mercury recipient.

Inez Crittenden

Johnson holds a Master of Science Degree and a Bachelor of Science Degree from the University of Maryland University College and is a graduate of the Warrant Officer Senior Staff Course. He is a lifetime member of the Signal Corps Regimental Association and lifetime member of the Military Officers Association of America.

Inez Crittenden

Inez Crittenden worked as a telephone operator in California at the age of 14. She later worked as a secretary to the president of the California Packing Corporation in San Francisco. She was one of the first women to join the Army Signal Corps, where her fluent French skills were in demand during World War I. In January 1918, she became Chief Operator, Second American Unit of Telephone Operators, in charge of hundreds of American women who worked as interpreters in war-related telephone communications. She and her unit sailed for France in March 1918. Crittenden was soon transferred to work for the public relations bureau at the American Embassy in Paris.

160 Years of SIGNAL HISTORY

Maj. Myer's Signal Corps (1861-1865)

Steven J. Rauch
Signal Corps Branch Historian

For thousands of years humans have attempted to communicate information over long distances in a variety of ways. Various methods were tried to increase the speed of carrying a message, cause a noise to be louder, or a visual sign to be seen more clearly. Effective communication has always been vital to military success. When military units fought in close combat, a commander's voice was adequate to transmit commands. Over time armies adapted musical instruments, flags, and even animals, to pass important messages. As armies and battlefields grew in size, a need developed for commanders to exercise command and control over their forces at extended distances.

During the American Revolution, Baron von Steuben instituted the US Army's first system of drill procedures, including standardized signals to maneuver troops. The US Army did not, however, adopt more modern communications methods until the invention of the electric telegraph in the 1840s but it was unsuitable for quickly changing tactical situations. However in the mid-1850s one innovator unlocked a practical solution to the challenge of controlling armies on an extended battlefield. That innovator was Albert James Myer.

Birth of the Signal Corps

The idea that an army should have soldiers dedicated to enable communications is attributed to Dr. Albert James Myer. While a medical student, Myer worked in a telegraph office and became familiar with the Bain electrochemical telegraph system. Myer used his experience to devise *A New Sign Language for Deaf Mutes,* the subject of his dissertation. Myer proposed a "system of sign writing" based upon the Bain telegraphic alphabet. In 1854 he received an appointment as an assistant surgeon in the US Army Medical Corps. While serving in Texas, Myer's interest in military signaling began. He proposed the War Department consider a signal system using flags based on the concepts of sign writing. Secretary of War John Floyd asked Myer to present his system to an Army review board and on March 3, 1859, Myer appeared before the board - headed by Lt. Col. Robert E. Lee - where he demonstrated his "Wig-Wag" system of flag signaling. The board found Myer's system useful, but asked for more operational testing before adopting it for use.

In April 1859 Myer began testing various materials to determine the best design and equipment for the wig-wag system. This system used a flag for daytime signaling and a kerosene fueled torch for nighttime signaling. The standardized flags consisted of one red and one white flag, a white center in the red flag and a red center in the white flag. The atmospheric and visual conditions determined which flag was to be used. Only one flag or torch was used at a time and field telescopes were employed to read the

messages. The operators of the wig-wag could typically send three words a minute over an average distance of ten miles between stations.

Once testing was completed, the War Department accepted the wig-wag system, but still needed to have personnel positions authorized and money appropriated to purchase wig-wag equipment. After intense lobbying by Myer and others, congress approved legislation on June 21, 1860 to appoint one signal officer at the rank of major and $2,000 to purchase signaling equipment. Myer was appointed as the Signal officer on June 27, thus becoming the first Signal officer in the US Army.

Myer used his wig-wag system during operations in New Mexico from 1860-1861. Myer, who considered signalmen to be Soldiers as well as communications specialists, believed that all Army officers should be trained in signaling; making it a user owned and operated system. However he soon sought the establishment of a separate force structure, or branch, to ensure a lasting signal capability for the US Army.

The Signal Corps in Combat

At the outbreak of the Civil War, Myer organized a signal camp of instruction at Fort Monroe, Virginia for soldiers who were detailed for signaling. The wig-wag system soon received its first test in combat in June 1861 to help to direct fire of an artillery battery against Confederate positions opposite Fort Monroe.. Until 1863 signal operations were conducted by Soldiers detailed from other branches in a temporary capacity. Finally, on March 3, 1863 Congress authorized a separate force structure for the Signal Corps for the duration of the war. The act provided for a Chief Signal Officer with the rank of colonel and other officers and enlisted personnel. Some 400 officers and about 2,500 enlisted men served in the Signal Corps during the course of the Civil War.

Albert J. Myer.
Courtesy photo

In response to commander's desire for a mobile field telegraph train, Myer introduced the Beardslee magneto electric telegraph into the Signal Corps. By 1863, the Signal Corps operated thirty telegraph trains. Myer's efforts however, clashed with the US Military Telegraph Service which was responsible for electric telegraphy using civilian contract operators. Myer overstepped his responsibilities and thereby incurred the wrath of Secretary of War Edward Stanton who relieved Myer as Chief Signal Officer in November 1863. However this did not hinder Myer from continuing what he viewed as his duty as founder of the Signal Corps, including writing *A Manual of Signals*, the first doctrinal manual for signal operations, in 1864.

During the Civil War, Signal Soldiers deployed in tree tops, on roof tops and on sig-

nal towers to locate enemy troop movements and pass messages. Signalmen were dispatched on reconnaissance missions and attempted to read enemy signal messages. This lead to the development of various encryption methods to provide information assurance and safeguard orders during operations. Signal personnel were employed in joint operations with the Navy and it became routine to station Army signalmen aboard naval vessels supporting ground operations. As Myer predicted, the integration of trained signal specialists with commanders at the tactical level resulted in faster and more reliable transfer of information and orders to units.

Gettysburg – July 1863

Fort McAllister, Ga., December 1864
Courtesy photo

By the time of the battle of Gettysburg in July 1863, Army leaders had come to depend on the capabilities provided by signal Soldiers. During that battle, information timeliness enabled Union commanders to seize several tactical and geographic opportunities before the Confederate army could react. Cpt. Lemuel Norton served as the Army of the Potomac Chief Signal Officer and worked closely with Maj. Gen. George G. Meade, throughout the battle. Signal teams were positioned in accordance with Norton's concept of a fully integrated wig-wag network. Norton established a critical signal station on Little Round Top at the extreme left of the Union line to report the enemy's movements. The signal corps station deterred Confederate tactical movements, especially an attempt on July 2 by Lt. Gen. James Longstreet's men to outflank the Union left. Ironically, Longstreet's chief of artillery was Edward P. Alexander, who referred to "that wretched little signal station" as a reason the attack failed at Little Round Top.

March to the Sea (November-December 1864)

In fall 1864, Maj. Gen. William T. Sherman began a march with over 60,000 men from Atlanta, Georgia to the seaport of Savannah, Georgia, a distance of about 300 miles. As the Army moved closer to Savannah, Sherman began planning to establish contact with US Navy vessels carrying much needed supplies. By mid-December, one of the remaining obstacles to be overcome was a small confederate fort located on the Ogeechee River, southeast of Savannah. Fort McAllister had to be seized so that navy ships could safely navigate the river and deliver supplies to Sherman's army.

Coordination for this mission was enabled by the signal teams embedded within the Union command structure. Cpt. James M. McClintock, Chief Signal Officer, Army of the Tennessee, reported, "On the 11th [Dec] [we] established a station of observation at a rice mill on the Great Ogeechee two miles and a half north of Fort McAllister. …A strict watch was kept [for] any vessel that might be…near the mouth of the river."

Brig. Gen. William B. Hazen's division was selected to attack Fort McAllister on December 13, 1864 and Hazen's signal team established communications with the rice mill to receive orders. Sherman directed McClintock to, "Signal Hazen that he must carry the fort by assault." That message launched 4,300 men into a violent attack that lasted about fifteen minutes and the fort fell quickly into Union hands. While the battle unfolded, a Navy ship was spotted in the river. McClintock's signal team immediately exchanged wig-wag messages with the vessel. During a span of about thirty minutes, signal teams had demonstrated how Myer's wig-wag system could provide combat commanders long-range, line-of-sight, command and control to support both ground combat and joint communications. A new era in military communications and modern warfare had been born as a result of Myer's Signal Corps.

The Stormy Years (1866-1891)

Steven J. Rauch
Signal Corps Branch Historian

After the Civil War congress passed legislation in 1866 providing for the postwar force structure of the US Army. Gen. Ulysses S. Grant recommended that Myer be restored to his position as Chief Signal Officer, a post he resumed in 1867. Myer then set out to rebuild and refocus a much smaller Signal Corps for postwar missions. During a period sometimes known as the "dark ages" of the Army due to cutbacks and isolated frontier operations, Myer faced multiple challenges, one of which was to justify once again why the Army even needed a Signal Corps. During this period one of the officers detailed to Signal duty was 2nd Lt. Adolphus W. Greely. Unknown to Myer, this would be the beginning of Greely's illustrious and long career with the Signal Corps from 1887 to 1906.

Joint Operations

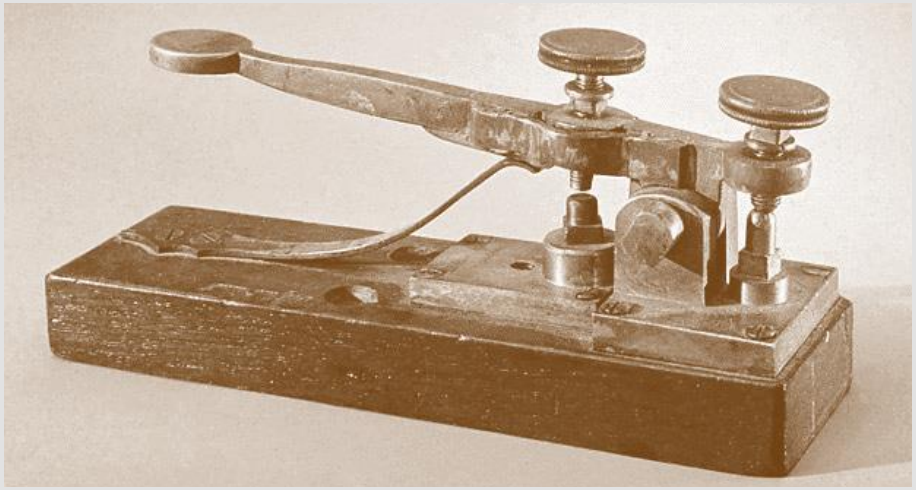
During the course of the Civil War, the Army and Navy had conducted numerous joint operations along the coasts and major rivers to enable transportation of troops and supplies; ship to shore fires capability; and command and control. The success of these war-time field associations inspired Myer to institutionalize and standardize signal training within the education systems of both services.

In his annual report for 1867, Myer enthusiastically described a project to incorporate instruction of visual signaling and telegraphy at the US Military Academy. In this regard, the Army was somewhat behind the US Navy which had already adopted Myer's wig-wag system at the Naval Academy during the Civil War. Myer hoped to synchronize Signal equipment, doctrine and training between the two institutions to ensure standardization during future joint operations. Myer stated, "It will be cause for congratulation when it shall be carried into effect, and it can be claimed for the Naval and Military Academies of the United States that they have been the first to secure…intelligent co-operation on which, in time of war, the fate of grand operations may depend." Referring to joint operations during the Civil War, Myer concluded that, "commands of the army and the vessels or forces of the navy can always be put in communications under any circumstances in which the use of aerial [visual flag] and electric telegraphy is practicable."

The telegraph finds a home in the Signal Corps

In 1867, in addition to its visual signaling duties, all electric telegraphy for the Army became the responsibility of the Signal Corps. This was a triumph for Myer because this was the issue that had cost him his job as Chief Signal Officer in 1863. Without the constraints of war, nor much attention from Army bureaucracy, Myer was able to supervise the development of a more effective and reliable field telegraph train using batteries and sounders.

Another post-Civil War responsibility assigned to the Signal Corps in 1874 was the task for constructing, maintaining, and operat-



19th Century telegraph key
Courtesy photo

ing telegraph lines along the southwest frontier. By that time the Signal Corps had already constructed over five hundred miles of telegraph lines along the east coast. In 1875, Greely completed a line across Texas, in 1877, built telegraph lines from Cape Hatteras to Cape Henry, and in 1877, built a line from Santa Fe to San Diego. Greely became known as the Signal Corps "trouble-shooter" for regarding military telegraph line construction. By 1879, the Signal Corps had completed some 4,000 miles of telegraph lines in remote parts of the US and its territories.

Meteorological Service

In 1868, further personnel cuts were imposed on the Army, which reduced it to a skeletal force to police what remained of the western frontier. As a result, several Army organizations sought to defend themselves from further cuts by pursuing activities more civil than military in nature.

One civil pursuit was meteorology and how that science could be harnessed to improve the agriculture and general daily life of America. By 1869 many agricultural interests were urging Congress to create a national organization to observe and forecast the weather. A bill was proposed in Congress that these duties be assigned to the War Department because "military discipline would secure the greatest promptness, regularity and accuracy required in observations." Just as the Army was questioning whether or not it still needed a Signal Corps, Myer took the initiative to seek this new mission to keep the branch in existence. He called upon congressional supporters who later stated he had "a most intense desire that the execution of the law be entrusted to him." On March 15, 1870, the Secretary of War assigned these new federal weather duties to the Signal Corps.

Adolphus W. Greely
Courtesy photo

From 1870 to 1891, the Signal Corps operated the nation's first modern weather service using both commercial and military telegraph lines to report weather observations to Washington DC. The observation stations were established based on previous courses of storms and the availability of telegraph service. In October 1870, an observer-sergeant was sent to each of 25 stations between the Mississippi Valley to the Atlantic and Gulf coasts. Each station was equipped with a barometer, thermometer, hygrometer, anemometer, anemoscope (wind vane) and pluviometer (rain gauge). After readings were collected, they were sent via telegraph to the Signal office in Washington DC where the data was compiled and analyzed to reflect the weather for the United States. At least one-third of American households received the Signal Corps weather information in some form, mainly through the newspapers. By 1878 there were 224 Signal Corps weather observation stations making eight reports daily. By the time Myer died in 1880, the US Army weather service was world renowned.

Arctic Expeditions

In 1880 and 1881, the US participated with other nations in establishing circumpolar stations to study the Arctic weather and climate. The Signal Corps, now headed by Chief Signal Officer Brig. Gen. William B. Hazen, dispatched two expeditions. One led by Lt. Phillip H. Ray went to Point Barrow, Alaska. Greely led the second to the north of Greenland. Interested in climatology along with other aspects of scientific geography, Greely volunteered for the expedition to the station planned for Lady Franklin Bay. The Greely Expedition spent four harrowing years in the arctic because relief parties were unable to reach them. When they were finally rescued in 1884, the Greely expedition was reduced

to six survivors out of the 22 men who had made the journey. However, they did accomplish their mission and the scientific data they collected provided valuable knowledge about the earth's climate and tidal patterns.

The Storm Passes - New Missions and Focus

In the 1880s, there was growing dissatisfaction by both civilian and military officials with the Army managing a function that was essentially civilian in nature. In 1884 a congressional committee concluded that, “the Signal Service is now a Weather Bureau with a corps of men performing this civil service while they are enlisted in the Army. The Army gets no benefit from this Signal Corps, and places no reliance upon it for military service.”

In 1889, Congress ordered that the weather service be transferred to the Department of Agriculture. The formal transfer took place on July 1, 1891 when Professor Mark W. Harrington of the University of Michigan became the first civilian chief of the US Weather Bureau. All of the equipment, stations and personnel were transferred from the Army, resulting in a tremendous drop in personnel strength for the Signal Corps, whose role once again became focused on military communication technology.

When Hazen died in 1887, Greely was promoted to Brigadier General and appointed Chief Signal Officer; and he quickly renewed emphasis on tactical signaling for the Army. In the face of inadequate training, reduced funds, and a congressional effort to abolish the Signal Corps, Greely managed to introduce new modes of communication into the Army. In 1890, he equipped some Signal Corps units with the first heliographs which used mirrors to reflect sunlight over long distances. Greely also sponsored experiments leading to the Signal Corps' first field telephones. By 1890, he placed telephones in lighthouses and lifesaving stations along the Atlantic coast. In 1892, approximately one half of the country's Army posts were equipped with telephones. Photography was another interest of Greely and the Signal Corps. In fact, the Army's first photographer, Sgt. George W. Rice, had accompanied Greely on his Arctic expedition. From that experience Greely realized the informational value of photography. He added a course in photography to the Signal Corps curriculum at Fort Riley, Kansas. In 1896, the Government Printing Office published the Signal Corps' initial *Manual of Photography.*

The expedition ship Proteus moored in a harbor during the Greely Arctic Expedition
Courtesy photo

The Signal Corps Takes to the Air (1892-1918)

Steven J. Rauch
Signal Corps Branch Historian

Since its beginning, the Signal Corps found that its scope of missions included any technology that enabled an extended line of sight, such as a signal tower. A technology that provided the benefits of a tower, enabled a greater line of sight and mobility came in the form of aerial platforms such as balloons, dirigibles and aircraft. As a result, the Army viewed the Signal Corps as the branch with the most need as well as the technical knowledge to pursue aeronautical technologies. From early work with balloons, to experimentation with aerial photography and finally the harnessing of powered flight, the Signal Corps served as the aviation center for the Army into World War I. As military aviation matured, many aviators, such as William "Billy" Mitchell, sought an independent air organization and divorce themselves from Signal Corps control. That occurred in 1918 with the formation of the Army Air Service, a forerunner of the US Army Air Corps, the US Army Air Force and in 1947, the US Air Force.

Balloon House, Fort Omaha, Neb. Courtesy photo

An Inauspicious Start

During the first major campaign of the Civil War in July 1861, Myer found himself involved in an incident which caused him great embarrassment. The US Army had contracted with John Wise of Pennsylvania for the use of silk fabric aerial balloons for reconnaissance. In early July, Wise provided the government a 20,000 cubic foot balloon for $850.00 and he agreed to serve as a contract military balloonist.

The balloon was delivered to Washington on July 21 and was quickly assigned an observation mission for the impending battle of Union and Confederate Armies near Manassas, Virginia. A ground crew walked the inflated balloon up Pennsylvania Avenue to Georgetown, then up the Chesapeake and Ohio Canal, and then across a Potomac River bridge to Fairfax Road. At that point, Maj. Myer seized control of the balloon citing his position as Army Signal Officer and ordered it fastened to a horse-drawn wagon to move it quickly to the battlefield. As Myer, Wise and the balloon party made their way closer to the battle, it became increasingly difficult to maneuver the bobbing gas bag around trees and telegraph wires.

In his impatience to reach the battle Myer ordered the horses whipped to increase their speed. Almost immediately, the balloon snagged in the branches of a tree and huge holes were torn in the bag and the balloon deflated. Myer then ordered Wise to take the crippled balloon back to Washington, repair it and bring it back to the battle. Myer was very bitter about the incident and when an opportunity came for the Signal Corps to assume balloon operations later in the war; he refused on grounds that he did not have the money or men to operate such a system. In spite of this incident, this was a forerunner of the Signal Corps being associated with all things aeronautical for the next several decades.

The Signal Balloon Service is formed

The Signal Corps resumed its interest in military balloons after losing the weather service function in 1891. In 1892, Chief Signal Officer Adolphus W. Greely directed that a balloon section be included in each telegraph train. The first balloon obtained for this mission was named the *General Myer* in honor of the branch founder and was demonstrated at the World's Columbian Exposition held in Chicago, Illinois in 1893. In 1896, Greely established the first balloon training facilities at Fort Logan, Colorado.

In a related development, in 1898 Greely was appointed to the War Department's joint Army-Navy board to investigate the military usefulness of heavier-than-air-flying machines. Greely observed the experiments of Professor Samuel P. Langley of the Smithsonian Institution, who had previously served as a civilian weather specialist for the Signal Corps. Based on Langley's experiments, Greely recommended the Army pursue building a flying machine and sought Army funding for Langley to expand his research. The Army directed Greely to monitor Langley's progress and though the Langley project ultimately failed, the experiments with the flying machine were a harbinger of events to come.

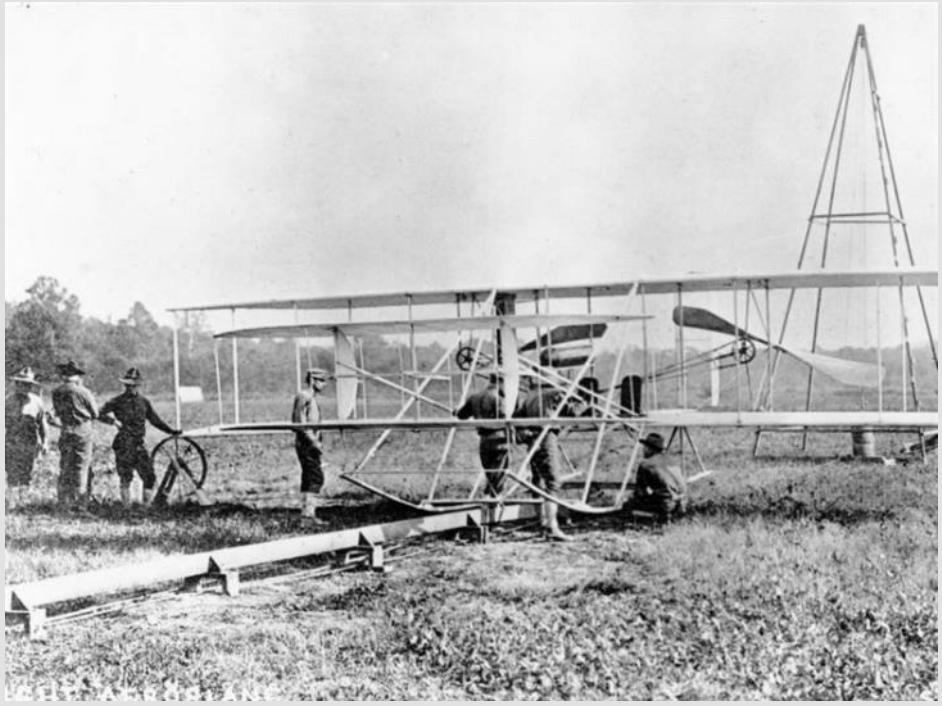
Balloons in the Spanish American War

During the Spanish-American War, the Signal Corps used a tethered balloon to provide reconnaissance for the attack on the Spanish defenses at San Juan Hill, Cuba. The balloon was the responsibility of pilot Lt. Joseph Maxfield. On July 1, 1898, Maxfield and an observer, Lt. Col. George F. Derby, ascended near the American position at El Pozo. Derby wanted to get closer to the fighting and ordered the balloon moved toward enemy lines. As the ground crew moved the balloon forward, it provided the Spanish an excellent target. When the guide ropes became entangled in the brush the balloon was completely immobilized. When the Spanish opened fire, shrapnel and bullets rained down upon the balloon handlers causing numerous casualties. The balloon was torn apart in the fusillade but the two passengers were not hurt. Luckily, the officers did locate a previously unknown trail through the woods that troops could use during the attack upon San Juan Hill.

The Aeronautical Division and Signal Corps Aircraft No. 1

In 1906, Greely's successor, Brig. Gen. James Allen, placed considerable emphasis on aviation. His assistant, Maj. George O. Squier, had been following the progress of two bicycle makers from Ohio, Wilbur and Orville Wright. After their successful flight at Kitty Hawk, North Carolina, in December 1903, the Wright's had tried to interest the Army in their invention, but after the Langley experience, the Army was reluctant to invest in another experiment.

However, pursuit of balloons and aerial photography continued and the Signal Corps purchased a new balloon in 1907. It was the ninth balloon since the Civil War and, therefore, dubbed Signal Corps Balloon No. 9. Allen directed the establishment of a balloon house and hydrogen plant at Fort Omaha, Nebraska in 1908. But, ballooning activities became dormant when the Army leadership more clearly understood the importance of the Wrights' achievement.



Signal Corps No. 1, the Army's First Airplane
Courtesy photo

On August 1, 1907, the Signal Corps established a small Aeronautical Division led by Captain Charles DeForest Chandler to take "charge of all matters pertaining to military ballooning, air machines, and all kindred subjects." Five months later, on December 23,

Allen issued a bid for a flying machine that could fly forty miles per hour and carry two people a distance of 125 miles. It had to be managed in flight from any direction, stay aloft for one hour and land at the takeoff point undamaged. It also had to be easily disassembled for transport on wagons. The Army received forty-one bids but only three met the specifications. Of those three, the Wright brothers were the only contractor to deliver an airplane. On February 10, 1908, the Wright brothers and the Signal Corps entered into a formal contract for a heavier-than-air flying machine to be delivered to Fort Myer, Virginia.

On August 20, 1908, Orville Wright delivered the airplane. The Army's review board consisted of Maj.'s George O. Squier and Charles S. Wallace; and Lt.'s Frank Lahm, Benjamin D. Foulois, and Thomas E. Selfridge. Test flights began on September 3 and continued until tragedy struck on September 17 when Selfridge became the first airplane crash fatality. The Army directed the Wright's to reexamine their aircraft and flights were not resumed until 1909.

The Wright's made minor modifications to their flyer and tests began on July 27, 1909. On that day Orville Wright flew the plane for one hour and twelve minutes, thereby fulfilling the endurance specifications. Three days later, the speed requirement was surpassed. On August 2, 1909, the Army accepted the Wrights' airplane, designated as Signal Corps No. 1, and paid them $30,000 for their work.

Wright Flyer crash, Fort Myer, Va. 1908
Courtesy photo

Signal Corps Flying Schools

The Signal Corps opened a flying school at College Park, Maryland in June 1911. Two of the new pilots 2nd Lt.'s Henry H. ("Hap") Arnold and Thomas Milling, had received training at the Wright Company in Dayton. With the onset of winter weather the Signal Corps sought a location in the south to continue training. Cpt. Chandler traveled through the southeast seeking a suitable location, visiting Aiken, Camden, Columbia, and Greenville, South Carolina as well as Augusta, Georgia. In Augusta, Chandler examined a farm owned by George T. Barnes on Sand Bar Ferry Road that had a large, level field almost two miles long and one mile wide area for the planes to use.

On November 11, 1911, Chief Signal Officer Gen. James Allen announced the Signal Corps would use the Barnes Farm for winter aviation training. The hangers for the aircraft were made of canvas, and appeared much as circus tents. On November 28, five officers, twenty enlisted men, four airplanes, motor vehicles, Wagons and horses left College Park for Augusta. The four planes included two Curtiss models and two Wright models.

The idea of moving the school to Augusta was to avoid winter weather, but as luck would have it, a snow storm hit the area on January 13, 1912. The challenges didn't end there when excessive rainfall caused the Savannah River to flood in March. Between the bouts of bad weather the pilots managed to fit in some practice. By spring the school finished training and prepared to return to College Park. The pilots made 436 flights during the 58 flying days they had available out of 124 days.

Flying resumed at College Park in April 1912 with several new planes. These more powerful Wright Type C "scout" planes designed to perform reconnaissance and could carry radio and photographic equipment in addition to two men. Experimental activities

Army Flying School - Augusta, Ga. Courtesy photo

conducted at College Park during this time included night flying, aerial photography, use of radio, and testing of the Lewis machine gun from the air. Four years after the Signal Corps took charge of air matters, Congress appropriated $125,000 for Army aviation and by the end of 1912, the Signal Corps had purchased eleven aircraft from the Wrights and their competitor, Glenn Hammond Curtiss.

In early 1913, the Army ordered its aviators to Texas to participate in large scale maneuvers. At Galveston on March 3, the Chief Signal Officer designated the assembled men and equipment as the "1st Provisional Aero Squadron," with Chandler as squadron commander. The unit was formally activated as the 1st Aero Squadron on December 8 1913, the first official aviation unit of the US Army. The unit has remained on continuous active service and today is the 1st Reconnaissance Squadron, US Air Force. On July 18, 1914, as a result of congressional legislation, the Army established the Aviation Section of the Signal Corps to improve control of its fledgling flying capabilities.

Hunting Pancho Villa – 1916

Following a raid on Columbus, New Mexico March 9, 1916 by guerilla forces of Francisco “Pancho” Villa, the Signal Corps 1st Aero Squadron was employed during the Punitive Expedition into Mexico to help search for the terrorists. Cpt. Benjamin D. Foulois commanded the squadron which was equipped with Curtiss JN-2 aircraft that were used to carry messages from forward locations back to headquarters or to other commanders. However, the fragile machines could not cope with the high altitudes and strong winds encountered in the Mexican mountains. Within a short time, most of the aircraft had been damaged in accidents, but fortunately no men were killed or seriously injured.

By April 20, 1916, only two of the squadron’s original eight aircraft remained intact, but they were no longer operable. Without suitable equipment, the squadron remained effectively grounded for the remainder of the campaign. During the operation the 1st Aero Squadron had flown 540 missions and provided valuable training for the Army in air-ground operations.

World War I

By April 1917 when the United States entered World War I almost all of the combatants had developed aircraft industries far superior to those of the United States. At the beginning of the war, the Signal Corps Aviation Section included fifty-two officers and 1,100 men. In 1917, the Signal Corps developed small aircraft radiotelephones. Two early sets were the SCR-68, an airborne radiotelephone, and the ground set, the SCR-67. By the middle of 1918, these sets were in France and although still had the problems of new technology, the radios marked a revolution in air-to-ground communications.

The lack of adequate American aircraft lead to Army aviators using advanced French and British planes. This aspect reflected poorly on the Signal Corps, mainly due to funding and material resources, such as the proper wood not being available. This criticism along with aviators urging a desire for a separate organization, resulted in President Woodrow Wilson creating the Army Air Service and placed it directly under the War Department on May 24, 1918, officially ending responsibility for air matters by the US Army Signal Corps. By the time aviation was removed from Signal Corps control it had grown to an organization with 16,084 officers and 147,932 men.

America's Rise to World Power (1898-1917)

Steven J. Rauch
Signal Corps Branch Historian

Having transferred responsibility for meteorological duties, the Signal Corps returned to its original mission of providing military communications for the Army. During the previous decades, the Signal Corps had fallen behind its European counterparts in this arena. But it soon embraced emerging technologies such as wireless telegraph, the telephone, and aeronautics. The outbreak of the war with Spain in 1898 provided challenges for communications on a scale never before imagined. Persistent conflicts across the waters in the Caribbean and the Pacific required long-range, secure communications. The Signal Corps met these challenges of providing electrical communications at both the tactical and strategic levels.

Power Projection: The Spanish American War - 1898

In 1898, the United States went to war against a decaying Spanish empire. The orientation of the Army changed overnight, from concern with frontier constabulary operations to projecting power across the oceans. In April 1898, the Signal Corps was a force with only eight commissioned officers and 50 enlisted men. To expand quickly, Congress authorized the raising of volunteer units, including the creation of the Volunteer Signal Corps (VSC). Eventually the VSC would consist of seventeen companies, a balloon company, and a field telegraph train.

The Caribbean expedition's Chief Signal Officer was Col. James Allen. His first mission was to cut the Spanish cables, thereby, debilitating the enemy's communications. Allen received the Distinguished Service Cross for doing this under fire from the Spanish batteries in Morro Castle. The Signal Corps eventually established 2,500 miles of wire in Cuba in a grid of nine lines running north and south and one east to west trunk. Perhaps the most dramatic accomplishment of the Signal Corps occurred on May 19, 1898 when Greely located the Spanish fleet which for a time had eluded the US Navy. This intelligence led to eventual defeat of that fleet and US Naval superiority.

In the Philippines, Signal Corps units participated in the capture of Manila and the defending fortifications. While an infantry regiment advanced, a Signal unit occupied the beach on the left flank of the troops. Sgt. George S. Gibbs (later Chief Signal Officer) and Sgt. Henry F. Jurs used wigwag flags to signal Admiral Dewey's fleet, to both adjust Naval gunfire and identify the friendly forces positions. This event was photographed by Sgt. Harry Chadwick, marking the first instance of combat photography.

The Spanish American War was a testing ground for the Signal Corps new endeavors. With an improvised telegraph switchboard the Signal Corps switched messages through an office in Puerto Rico and established direct communications between Washington and the front lines in Cuba. Greely had foreseen the military value of telephones and this use of telephones in combat proved him right. The Army's reliance on wire however required signalmen to expose themselves to perilous conditions.

Heliograph
Courtesy photo

Counter-insurgency in the Philippines – 1899-1902

The end of the war with Spain marked a new era of American overseas involvement. The United States had acquired the former Spanish territories of Cuba, Puerto Rico, and the Philippines, making the nation a world power. With these possessions came increased duties and responsibili-

ties for the Army and the Signal Corps, including operating the telegraph and telephone lines formerly run by the Spanish government. However, Philippine leader Emilio Aguinaldo had hoped to win independence for his country at the end of the war. When that did not occur, he led an insurrection against the Americans on February 4, 1899. The next day, a Signal Officer, 1st Lt. Charles E. Kilbourne, Jr., became the third Signal Corps Soldier to earn the Medal of Honor. Under enemy fire at Paco Bridge, in a suburb of Manila, he climbed a telegraph pole to "coolly and carefully" repair a broken wire that reestablished communications with the front.

Working in a tropical climate presented many signaling challenges. To facilitate transportation through jungle and swamps, signalmen used water buffalo as pack animals. Wooden poles required constant repairs because they rotted in the humid and intense heat or were destroyed by ants. Insurgents constantly sabotaged the lines and ambushed the men sent to fix them. Thus, armed escorts often accompanied the signal parties to provide protection.

In addition to building and operating land lines, the Signal Corps received the mission to construct, maintain, and operate a communication system linking the major islands of the Philippine archipelago. By the end of 1899, the Signal Corps had connected the islands of Leyte, Cebu, and Samar by underwater cable. Though fighting continued, organized Filipino resistance gradually declined, especially after Aguinaldo's capture in March 1901. The Philippine war officially came to an end on July 5, 1902, in part due to the role of the Signal Corps in supporting counter-insurgency operations.

Manila Bay, Philippines, 1898
Courtesy photo

Alaska Communication System

In the wake of the Alaska gold rush and the increasing population of that remote territory, the War Department created the Military Department of Alaska. It became a Signal Corps mission to build a telegraph network connecting the headquarters at Fort St. Michael with five garrisons and the garrisons with each other. In 1900 Congress appropriated $450,000 to build the Washington-Alaska Military Cable and Telegraph System (WAMCATS). In the summer of 1901, Greely sent 1st Lt. William L. ("Billy") Mitchell to Alaska to investigate conditions there. Mitchell suggested that work continue throughout the winter when supplies could more easily transported over the ice and snow. When spring came, the material would be in place to begin work. Infantry and artillery troops assigned to Alaska performed much of the construction, with Signal Soldiers handling the technical aspects. The Army's only cable ship, the *Burnside*, also began installing underwater lines.

By 1903, the Signal Corps had constructed a network of telegraph lines and cables connecting all the Army's principal garrisons. Upon completion, WAMCATS comprised 2,079 miles of cable, 1,439 miles of land lines, and the wireless system of 107 miles—a total of 3,625 miles. Greely referred to this accomplishment as "unique in the annals of telegraphic engineering" and a monument to skill and perseverance of the Signal Corps.

Natural Disaster Relief - 1906

On April 18, 1906, San Francisco was hit by a great earthquake and the Army immedi-

ately assisted with firefighting, helped maintain law and order, and undertook emergency relief. The earthquake knocked out the city's phone system and destroyed almost all of the telegraph lines, leaving the city's half million residents isolated from the rest of the country.

The Signal Corps immediately stepped in during the emergency.

1st Lt. Billy Mitchell in Alaska, 1901
Courtesy photo

Cpt. Leonard D. Wildman, the departmental Signal Officer, established a field telegraph line between the Presidio and the outskirts of the fire within five hours after the quake. Wildman set up a system of 42 telegraph offices and 79 telephone offices that connected all of the military districts, federal buildings, railroad offices and depots, the offices of mayor and governor, and other needed agencies. One of the four Signal Corps automobiles was in San Francisco and on the first day traveled over 200 miles carrying messages, signal equipment, medical supplies, food, and sick and wounded personnel. With this help, the commercial telegraph companies were gradually restored to operational capability.

The Punitive Expedition 1916-1917

Shortly after midnight on March 9, 1916, a guerilla band of approximately 500 men led by Mexican revolutionary Francisco "Pancho" Villa attacked the border town of Columbus, New Mexico. The raid was in retaliation for U.S. support of Mexican president Venustiano Carranza. The attackers inflicted two dozen American casualties and destroyed thousands of dollars-worth of property. This hostile act prompted President Woodrow Wilson directed Brig. Gen. John J. Pershing to lead over 12,000 men on a punitive expedition into northern Mexico to capture Villa.

Cpt. Hanson B. Black was the Signal Officer for the expedition. In addition to advising Pershing on communication matters, he coordinated the operations of three field signal companies and the 1st Aero Squadron, a total of eighteen officers and 284 men. The Signal Soldiers employed a variety of technologies, including both wired and wireless communications, cameras, carrier pigeons, and – for the first time on campaign – airplanes. Early in the expedition, the two wireless (radio) wagon sets in service at Columbus and Colonia Dublán proved too heavy to keep up with the rapidly advancing cavalry columns. Consequently, almost all messages were sent via wire.

As Pershing moved deeper into Mexico, he was never out of communication with his base at Columbus, almost 400 miles away. A major problem, however, was the lack of insulated wire. Unprotected field lines shorted out when they became wet due to rain or morning dew. Even after insulated wire became available, breakage caused by animals and sabotage by enemy guerillas continued to compromise connectivity. To alleviate these problems, the Signal Corps established maintenance stations every twenty-five miles along the length of the line. Signalmen traveled on horseback and in light trucks to repair any breaks and were able to keep Pershing in contact with detachments located along his extended line of communications.

Unable to capture Villa and hoping to avoid a general war with Mexico, Pershing's punitive expedition returned to the United States in February 1917. Despite the unsatisfactory outcome, the expedition had provided the United States Army with valuable training for its imminent entrance into World War I.

World War I and the Depression Era (1917-1938)

Steven J. Rauch
Signal Corps Branch Historian

For years the US had managed to avoid involvement in the European war that began in 1914. However, its status as a world power and trading giant brought it into conflict on the oceans. In April 1917, Germany's resumption of unrestricted submarine warfare led Wilson to ask Congress to declare war against Germany. The US committed the largest American army ever sent into war, the American Expeditionary Forces (AEF), led by Gen. John J. Pershing.

During World War I, casualties suffered by Signal Corps Soldiers were second only to the infantry with 301 killed, 1721 wounded and 27 deaths from accidents. Signal Soldiers earned 59 Distinguished Service Crosses and 40 Distinguished Service Medals. Pershing commended the Signal Corps stating, "I desire to congratulate the officers and men of the Signal Corps in France on their work, which stands out as one of the great accomplishments of the American Expeditionary Forces" By the time the Armistice was signed in November 1918, the Signal Corps serving with the AEF comprised 50 field Signal battalions, 28 telegraph battalions, 6 training battalions and 21 Signal service companies totaling 1,462 officers and 33,038 enlisted men.

Expansion and Training

Although poorly organized, trained, and equipped at the beginning of the war, the Signal Corps met the challenge now under the leadership of Maj. Gen. George Owen Squier. Upon mobilization, the ground component of the Signal Corps grew from 55 officers and 1,570 enlisted men to 2,712 officers and 53,277 men.

To train the influx of Soldiers, several training and mobilization camps were established in 1917, such as Camp Alfred Vail, New Jersey; Camp Samuel F.B. Morse, Texas; Fort Leavenworth, Kansas; and Monterey, California. Special schools were established such as the Signal Corps Radio School at College Park, Maryland and the Signal Corps Buzzer School at Fort Leavenworth. In addition, special courses in subjects such as radio, telephony, telegraphy, photography, and meteorology were offered at civilian colleges and technical schools.

Adapting to 20th Century Warfare

The nature of combat during World War I proved extremely challenging for communications due to the increased size of battlefields and lethality of weapons, such as machine-guns. At the tactical level, trench warfare posed dif-

Signal Corps photographers in World War I
Courtesy photo

Signal Soldiers in theater
Courtesy photo

ferent challenges and required many adaptations to be made. Traditional lance poles for telegraph wires were not suitable, so wires were strung on short stakes or run along trench walls. Major trunk lines were often buried several feet underground to provide protection from enemy shelling and from foot and vehicular traffic. Telephone switchboards were installed in underground dugouts where they could withstand artillery bombardment.

On the frontlines, the Signal Corps employed ground telegraphy, or TPS (from the French "*telegraphie par sol"*) which worked by driving iron poles into the earth and transferring electrical energy from the transmitting to the receiving station by induction and conduction of electricity through the ground instead of through the air. TPS was not very secure, however, and could be easily tapped by the enemy.

Given these conditions, Col. Edgar Russel, Chief Signal Officer of the American Expeditionary Forces (AEF), was forced to install and operate an extensive network of telegraph and telephone wires extending from the seacoast to the American battle zone. The Signal Corps constructed a total of 1,700 miles of pole lines, used 3,200 miles of French poles, installed about 40,000 miles of combat lines, and established 134 telegraph offices and 273 telephone exchanges, excluding combat zone stations.

Early Radio – Heavy and Immobile

While establishing an extensive telegraph and telephone network, the Signal Corps experimented with radio. Before the war, radio was limited to Morse code transmission by means of spark transmitters or by continuous wave oscillations generated by triode tubes. The first spark sets were heavy and cumbersome. The Signal Corps provided two types of field radios which were large high-powered quenched-spark transmitters. The SCR-49 pack radio set could be disassembled into several components and transported by two or three Army mules. The SCR-50 a 2-killowatt spark transmitter was even larger and required several trucks or tractors to move.

By this time, the Allies were replacing spark equipment with equipment using vacuum tubes. Some in the Signal Corps were convinced that vacuum tubes were the key to superior military radios. Among them was Squier, who had a doctorate in electrical engineering. As Chief Signal Officer, Squier spearheaded cooperation with the commercial communications industry and the Signal Corps to perfect radio tubes. Six months after the military radio tube program began; American factories were producing standardized, interchangeable, and rugged tubes. Striving for even better equipment, Squier established a laboratory at Camp Alfred Vail and increased the army radio program from a few personnel in 1917, to several hundred by 1918. Other World War I developments in radio included the master-oscillator power amplifier circuit (MOPA), and Cpt. Edward H. Armstrong's super heterodyne circuit. The latter came too late for use in World War I but made a pivotal contribution to radio in the postwar period.

The Signal Corps in Combat

From August 30 to September 3, 1918, the US Army II Corps began an offensive under command of British and Australian forces. The two divisions of II Corps, the 27th Infantry and 30th Infantry, fought over a series of heavily defended ridges near Ypres, including a critical point called Mount Kemmel. The divisional Signal Battalions had enormous challenges to maintain communications.

By August 31, the 105th Field Signal Battalion of the 30th Division laid over 15,000 feet of communications wire to support forward command posts. This was because the German

defenders watched closely for runners carrying messages and attempted to kill them. One soldier wrote of this method, "That generally means six or seven men with the same message and if one gets there it is considered a success." On September 1, the 102nd Field Signal Battalion faced the same situation, but used both pigeons and dogs to send messages under heavy fire.

The most dangerous job on the battlefield was emplacing and maintaining communication wire. Most of the casualties inflicted upon Signal soldiers was due to this situation. One example of the courage needed for this duty was Corporal Howard P. DeRum who received a posthumous Distinguished Service Cross for extraordinary heroism on September 29, 1918 while serving with Company C, 102d Field Signal Battalion, 27th Division. Cpl. De Rum accompanied the first attacking wave of infantry and strung telephone lines while under enemy fire. After being advised by an officer to seek shelter, he ignored the advice and continued to maintain communications until he was killed.

Another example was Sgt. 1st Class Virgil C. Mottern who also received a posthumous DSC for his extraordinary heroism while serving with Company C, 105th Field Signal Battalion, 30th Division on October 19, 1918. Sgt. Mottern lost his life while personally laying a telephone line under continuous artillery fire. Pvt. George A. Morrice of the 102nd Field Signal Battalion wrote to his family, "You ask what the Signal Corps does in modern warfare. I wish you had asked what we don't do. That would have been easier. The main idea is to keep communication as perfect as possible under all conditions. It doesn't matter how it is done, as long as it is done." Morrice and his fellow Signalmen were recognized for their work through commendations from the division commander, Maj. Gen. John F. O'Ryan who stated, "The success of the operations was in no small measure due to the determination, resourcefulness, valor and endurance of the officers and men of the [102nd Field] Signal Battalion."

A Diversity of Missions – Photography & Pigeons

The Signal Corps mission expanded into other areas. Col. Russel established four new organizations responsible for combat photography, pigeons, meteorology, and radio intelligence. Although photography had been a Signal Corps responsibility since 1881, Pershing's order made photography an official mission. Field photography consisted of both ground and aerial. Ground photography, comprised of still and motion picture, was assigned to the Signal Corps in August 1917. Aerial photography was of paramount importance to the intelligence service. A total of 54 officers and 418 enlisted men constituted the photography personnel in France. After the war, all aerial photography and ground photography relating to aviation activities was transferred to the Air Service. The Signal Corps function was to maintain the historical files of still and motion pictures, produce training films, and

Mobile pigeon loft
Courtesy photo

manage ground photography not already under another service's control.

The Pigeon Service's mission was to create and maintain a frontline communications network using pigeons as the means to transfer information. During the war the Signal Corps used over 15,000 pigeons for these dangerous missions. By November 1917, two detachments of pigeoneers were in France. Pigeons were used during several battles including the St. Mihiel and Meuse-Argonne offensives. During the Meuse-Argonne over 442 birds were used who delivered over 400 messages at a cost of 119 pigeons killed in combat. During the later campaign, the pigeon Cher Ami earned the Distinguished Service Cross by delivering a message to the 77th Division headquarters to halt friendly artillery being dropped on the "Lost Battalion." Pigeons successfully delivered about ninety-five percent of the messages assigned them. Many were shot down by the enemy or suffered severe wounds.

Grace Banker, center, at awards ceremony receiving a Distinguished Service Medal
Courtesy photo

Women at War – The Hello Girls

In October 1917, Pershing asked the War Department for special units of skilled women switchboard operators in order to release male operators to serve at forward positions near the front. Because the AEF had to communicate with the French armies on its flanks and the Allied Headquarters Paris, it was important for operators to speak French as fluently as they spoke English. The War Department turned to the commercial telephone companies to help identify, recruit and train physically fit, college educated, French speaking, American women for this task. Out of 7,000 applicants, over 450, affectionately known as “Hello Girls,” completed training in signal duties and 223 of them were sent overseas in Telephone Operating Units (TOU). During the war, six TOUs were formed and sent to France where they were assigned to headquarters offices in Paris, Chaumont and Tours. Some smaller units of women served at the First and Second Army headquarters.

Grace Banker is awarded a Distinguished Service Medal

Grace Banker served as Chief Operator; First Army Headquarters during the St. Mihiel and Meuse-Argonne offensives earned her the Distinguished Service Medal. Because of her experience as a switchboard instructor at AT&T, Banker was placed in charge of 33 women of Telephone Operating Unit No.1. On August 25, 1918, Banker and six other operators were ordered to First Army Headquarters about five miles south of St. Mihiel. When the St. Mihiel offensive began, Banker and the other women operated the switchboards during the intense opening artillery bombardment. When First Army HQ moved to Bar-le-Duc, Banker and her operators displaced as well. While there, Banker and the other women endured aerial bombardment from German planes.

The Armistice ended all combat operations on November 11, 1918. Banker was sent back to Paris where she was assigned to work for President Woodrow Wilson, a duty she described as “not particularly exciting.” When given a choice to remain there or go to the Army of Occupation at Coblenz, Germany, Banker chose to leave Paris. While at Coblenz, Banker was presented with the Distinguished Service Medal during a ceremony recognizing her, “For exceptionally meritorious and distinguished services. She served with exceptional ability as Chief Operator in the Signal Corps Ex-

change at General Headquarters, American Expeditionary Forces, and later in a similar capacity at First Army Headquarters. By untiring devotion to her exacting duties under trying conditions she did much to assure the success of the telephone service during the operations of the First Army."

Upon their return from the war, the Hello Girls did not receive formal discharge papers because they were considered to have been civilian volunteers and not members of the military. In 1977 Congress finally passed legislation that granted them status as veterans.

Post War Army Reorganization

The return to peace resulted in a rapid demobilization of the US Army and by June 1919, the strength of the Signal Corps had dropped to 1,216 officers and 10,372 men. By 1920, its strength was reduced to 241 officers and 4,662 enlisted men.

In April 1919, Pershing convened a committee to examine the lessons learned from the war. The review concluded that Signal Corps responsibility for communications should extend only down to the division level. Below division, units should be responsible for their own internal communications and to connect themselves to higher echelon lines above the division. This meant that the Signal Corps no longer controlled an integrated network from the front lines to Washington as it had during the war. The Chief Signal Officer strongly objected to this change, but his protest fell on deaf ears and the Army's revised *Field Service Regulations*, approved in 1923, reflected the doctrinal modifications.

During the postwar era, the Signal Corps suffered personnel and budget cuts while still trying to meet the escalating demand for telephone and other Signal services. Signal training was adversely affected as well, as most training camps were closed after the war. One exception was Camp Vail, New Jersey, which became the home of the Signal School in October 1919. There, training would be conducted for both officers and enlisted men, along with students from foreign armies. In 1925 Camp Vail was renamed Fort Monmouth to commemorate the Revolutionary War battle that had occurred nearby in June 1778.

Peacetime Challenges and Preparation for War

In spite of these challenges, the leadership of the Signal Corps sought to improve their skills and knowledge with a professional publication. On April 1, 1920 the Office of the Chief Signal Officer published *Information Bulletin No. 1* for the purpose of keeping all Signal Corps personnel informed about future developments for organization, training, methods and equipment including lessons learned during World War I. *The Information Bulletin* thus provided a forum for exchanging information about the challenges of future high speed, mechanized, advanced technology warfare.

Fort Monmouth, N.J., Signal Development Lab
Courtesy photo

A major projects during this period was the modernization of the Washington-Alaska Military Cable and Telegraph System (WAMCATS). By 1924, the Signal Corps had replaced 1,607 miles of cable with more durable gutta percha cable. By 1930, radio cir-

cuits replaced all telegraph stations, except for one telegraph line along the Alaskan Railroad. With the conversion to radio the system was renamed the Alaska Communications System. During WWII this system would prove invaluable during operations in such a remote region.

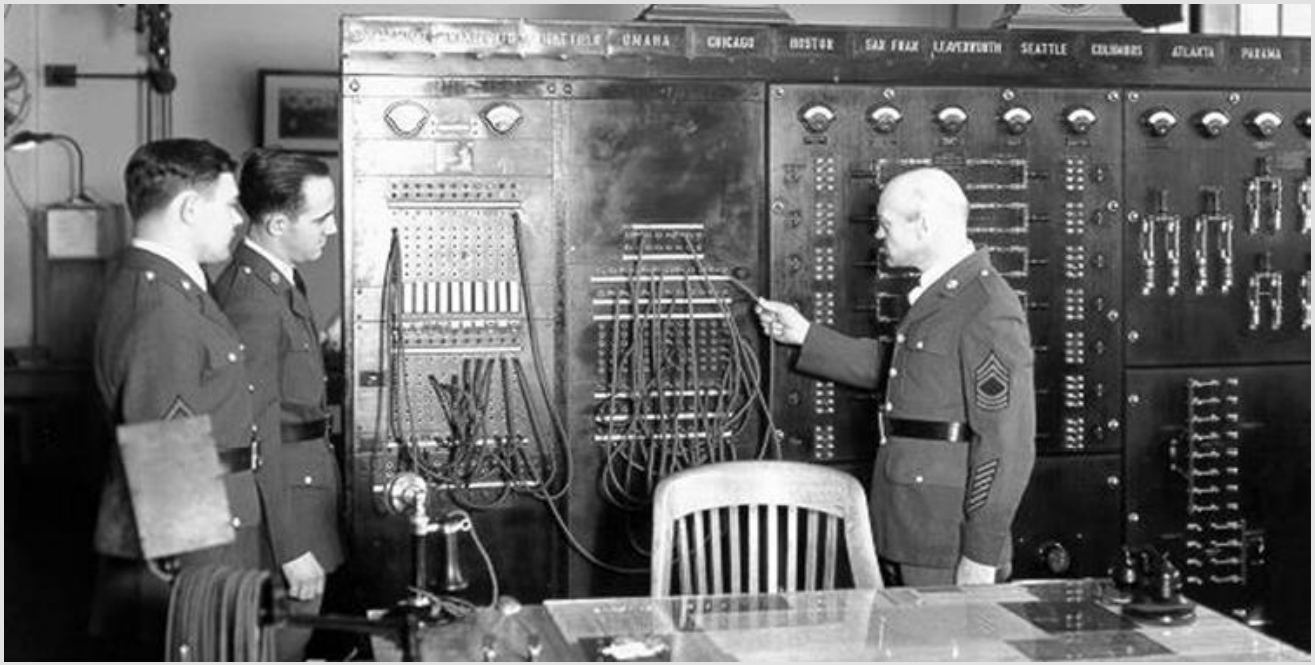
Another mission assigned to the Signal Corps was installing, operating, and maintaining the War Department message center. During the mid-1930s the timely and proper routing all radio, telegraph, and any other messages became the message center's responsibility. This experience with routing, processing and coordinating message and telephone traffic laid the groundwork for expanding this capability when the next war appeared.

New Technology – Radio and RADAR

Despite limited budgets of the 1930s, the Signal Corps continued research and development efforts for new technology. One significant development was the teletypewriter. Although it was too large for tactical use at the time, teletypewriters soon replaced telegraph equipment as the standard means for conducting fixed station administrative communications such as at the War Department.

An innovation that provided new capability for future warfare was the invention of frequency modulation (FM) radio by Dr. Edwin H. Armstrong. In the late 1930s, with Armstrong's assistance, the Signal Corps laboratories produced the first pushbutton, crystal-controlled, FM tactical radios, which did not have to be tuned using a dial. When the Army began experiments with motorization and mechanization, the need for mobile communications became critical because without radios, tank units had to communicate using line of sight flag and hand signals. FM radio technology made vehicular radio feasible because it eliminated noise and static interference, and could transmit over a wider range of frequencies.

The most significant development in technology was radar, an acronym for **ra**dio **d**etecting **a**nd **r**anging. In May 1937, Col. William Blair, Director of the Signal Corps laboratories, conducted experiments with sound ranging to locate approaching enemy aircraft from the noise of their engines. From these experiments the Signal Corps began production of two radar sets, the SCR-268 was designed to direct searchlight beams upon aircraft for targeting antiaircraft fires, while the SCR-270 was a mobile, long-range, aircraft early warning set. This technology enabled timely detection of aerial threats by Signal aircraft warning units and provide air and ground leaders information needed to defeat an aerial attack on US territory.



War Department Message Center, 1934
Courtesy photo

World War II (1939-1945)

Steven J. Rauch
Signal Corps Branch Historian

Throughout the 1930s, the world situation grew unstable due to the rise of Nazism in Germany, Fascism in Italy, and Japanese military aggression in the Far East. When war began in Europe in 1939, the United States anticipated the possibility of future involvement, though the nation sought to remain neutral. As it prepared, the Signal Corps needed thousands of men to provide a wide variety of skills. As in World War I, the Signal Corps tapped into the pool of civilian communicators. Soon the influx of recruits quickly outgrew the existing training facilities at Fort Monmouth. Signal training expanded nationwide to locations that included Camp Crowder, Missouri; Davis, California; and Camp Murphy, Florida. Those schools set the standard by which the Signal Corps would be known - an organization of skilled soldiers capable of providing immediate global communications.

4th Signal Service Company Soldier
Courtesy photo

"This is not a Drill" – Success and Failure in the Air Domain December 7, 1941

The Signal Corps efforts to modernize strategic communications had meet resistance in some quarters of the army. Unable to build more powerful transmitters; it could not extend the range of its radio network to the West Coast. On December 6, 1941, the Signal Intelligence Service in Washington DC intercepted a dispatch from Tokyo. The message indicated the Japanese government was going to break diplomatic relations with the United States. The Signal Corps, unable to get the message through to Hawaii with its own equipment, had to use commercial telegraph to San Francisco where it was then relayed to Hawaii. By the time the message was delivered, it was too late.

In Hawaii, two Signal Corps soldiers manning the SCR 270B radar at the Opana Point station on Oahu had ended their shift. While waiting for transportation they continued to monitor the radar to become more familiar with the system. At 7:02 am on December 7, 1941, Pvt.'s George A. Elliott and Joseph L. Lockard saw an echo on their scope indicating a large formation of aircraft about 130 miles away. At first they thought the radar was malfunctioning, but after rechecking, they determined it was a flight of aircraft approaching at about three miles a minute.

At 7:20 am they notified the air warning center at Fort Shafter. The officer on duty, 1st Lt. Kermit A. Tyler, told them, "Don't worry about it." Tyler assumed they were a flight of B-17 bombers or US carrier planes returning to Pearl Harbor. He did not question Elliott or Lockard about the direction, speed or time of arrival of the unknown planes. Since their reports of incoming planes had been ignored, Lockard and Elliot returned to their billets for breakfast. The Signal Corps equipment, training and aircraft warning procedures had worked perfectly and Signal Soldiers had ensured the message had gotten through in a timely manner. The poor situational awareness and ina-

bility of leaders to comprehend the information and coordinate efforts to successfully defend against a threat in the air domain resulted in December 7, 1941 becoming a “day of infamy.”

The Master Trainer of Monmouth – Reuben Abramowitz

Under the leadership of Chief Signal Officers Maj. Gen. Dawson Olmstead and Maj. Gen. Harry C. Ingles, the Signal Corps responded to the call to arms. The Signal Corps grew from 27,000 to 350,000 Soldiers supporting the US Army in theaters around the world. Training this many Soldiers in common procedures and techniques required a sound training program of instruction. Master Sgt., later Lt. Col., Reuben Abramowitz was a Soldier, trainer, and athlete who dedicated his life to the US Army Signal Corps. The outstanding Signal Corps performance during World War II can be directly attributed to the superb efforts of Abramowitz, who one Signal Corps general officer claimed, “taught us how to be generals.”

The son of Russian-Jewish immigrants, Abramowitz joined the New York National Guard in May 1916. During World War I, he served with the 37th Anti-aircraft battalion in France and with the 1st Field Signal Battalion. Abramowitz arrived at Ft. Monmouth in October 1926 where he began a 15 year career an instructor at the US Army Signal School. A master technical trainer and innovator, Abramowitz reduced the program of instruction time for code operators from 200 hours to 100 hours by combining the skills of typing and coding in simultaneous instruction.

Lt. Col. Reuben Abramowitz
Courtesy photo

By the time he was promoted to major in 1943, Abramowitz was known as the “Dean” of Signal training and had perfected the techniques required to expand Signal Corps training. Over 30,000 officers graduated from some fifty courses while almost 400,000 enlisted men were trained in communications-electronics.

An Explosion in Technology

Along with personnel growth were continued advancements in almost all elements of communications. The FM radio proved its worth not only in tank warfare, but in amphibious assaults, and for ship-to-shore use. In combat situations vehicle operators benefitted from the static-and-interference-free FM sets that plagued the amplitude modulation (AM) sets and their users. Engineers at the Signal Corps Laboratory developed a break-through tactical communications device - the walkie-talkie. The SCR-300 walkie-talkie was an AM (amplitude-modulated) radiotelephone transceiver that weighed about 25 pounds and had a range of up to five miles. Walkie-talkies would provide combat units a portable technology that enabled increased ability to maneuver for units beyond the tether of field telephone lines.

One combat veteran wrote, "I know the fighting would have lasted longer if we hadn't had FM on our side. We were able to shoot fast and effectively because we could get information quickly and accurately by voice, on FM. FM saved lives and won battles because it speeded our communications and enabled us to move more quickly than the Germans, who had to depend upon AM."

The worldwide nature of war necessitated global strategic communications using long-range, transoceanic, multichannel circuits to handle the extraordinary flow of message traffic. The Signal Corps developed new enciphering and deciphering machines that could be synchronized with the teletypewriters at both ends of the circuits. In addition the Signal Corps installed and maintained the the Army Command and Administrative Net (ACAN), a vast global system headquartered in Washington and

eventually the Pentagon that enabled national military and civilian leadership to communicate with theater commanders throughout the world.

Multi-Domain Operations – The Joint Assault Signal Company

During late 1943, the Joint Chiefs of Staff ordered an organization be established to improve communications between land, sea, and air forces during amphibious operations. The Joint Assault Signal Company, or JASCO, was formed by adding naval shore fire-control parties and Army Air Force air liaison teams to Army signal companies. A Signal Corps major commanded the JASCO because it was much larger than a normal signal company, with an authorized strength of about 500-600 Army, Navy and Army Air Force Signal personnel. The JASCO implemented common communications procedures for amphibious assaults, to include planning for joint radio frequencies, message transmission procedures, close air support, and naval gunfire.

During WWII eleven JASCOs served in all theaters of operations. Three JASCOs operated during the landing on Normandy beaches in June 1944. At Kwajalein Atoll, a JASCO attached to the 4th Marine Division improved artillery, air, and naval coordination to a great extent. On hotly contested beaches, such as Saipan, JASCO casualties were often very high, mainly because the men focused on their communications missions instead of providing for their own protection. The Signal Corps JASCOs had proved indispensable in linking air, ground and naval communications during complex multi-domain operations during World War II.

Native American Code-Talkers at Normandy

The Allied invasion of Normandy is one of the most famous military operations in history. Over 2,700 ships – from battleships to landing craft – carried, escorted and landed over 130,000 troops on five beaches along fifty miles of Normandy coast. Overhead, Allied aircraft controlled the skies and over 1,000 transports dropped paratroopers to secure the flanks and beach exits of the assault area.

The US Army's 4th Motorized Infantry Division, the "Ivy division" was selected to land at Utah Beach. The 4th division was an experimental division that contained new technology as the prototype for the "motorized" division concept. The 4th Signal Company had the task of integrating communications equipment and procedures for this cutting edge organization. It also had a special capability that no other Army signal unit possessed - 17 native-American signalers more commonly known as Comanche "Code Talkers"

The Comanche's were to send messages in a native language that could not be broken by the enemy and ensured communications security. They trained on procedures for divisional communications and agreed on using Comanche words for particular military terms. According to one of the code-talkers, "We talked Indian and sent messages when need be. It was quicker to use telephones and radios to send messages because Morse code had to be decoded and the Germans could decode them. We used telephones and radios to talk Indian then wrote it in English and gave it to the commanding officer." Two code-talkers were assigned to each of the divisions' three infantry regiments. They could send coded messages from the front line to division headquar-

Comanche Code Talkers
Courtesy photo

Army Pictorial Center Film Studio in Astoria, N.Y.
Courtesy photo

ters, where other code-talkers decoded the messages.

On June 6, 1944 at 6:30 am, the division splashed ashore at Utah Beach. One of the first radio messages was sent by a code talker on the beach to another on an incoming boat. After translation, the message said, "Five miles to the right of the designated area and five miles inland, the fighting is fierce and we need help." None of the Comanche's were killed, but two were seriously wounded during the landings. Within 15 hours the entire division had landed on Utah beach and the next day broke through enemy defenses to link up with elements of the 82nd Airborne Division at St. Mere Eglise.

Women and Minorities in the Signal Corps

At home and overseas, members of the Women's Army Auxiliary Corps (WAAC) later designated the Women's Army Corps (WAC), replaced men in message centers and at switchboards. They also worked in film libraries and laboratories, and performed Signal intelligence duties such as cryptography. The Signal Corps employed more WACs than any other technical service except the Chemical Warfare Service. In total, about 5,000 of these women worked for the Signal Corps.

African-American soldiers also played an important role in the wartime Signal Corps. Many black units performed construction duties, such as the 275th Signal Construction Company. This unit deployed to Panama in December 1941 to build pole lines. It later served in four campaigns in the European theater. The inclusion of Native Americans, African-Americans and women to leverage their skills and abilities in the social domain proved to be a significant contribution to winning the war.

Filming the War

On every battlefield Signal Corps cameramen were "shooting the war" and their work provided an outstanding visual record of the conflict. In addition to covering combat operations, the Signal Corps operated in the information domain to produce films to explain the war to the public and Soldiers who were fighting it. Hollywood directors such as Frank Capra and John Huston were commissioned into the Signal Corps to produce documentaries. Capra's series of, Why We Fight, films received an Oscar from the Academy of Motion Picture Arts and Sciences, and he received the Distinguished Service Cross for his work. One member of Capra's film crew was Theodor Seuss Geisel, who later became famous as children's author, Dr. Seuss. Another famous artist was Sgt. Stanley M. Lieber, known more commonly as Stan Lee, the creator of Spiderman, who served as a playwright and illustrator supporting the visual information program.

The Signal Corps Command Post Fleet in the Pacific Theater

On October 20, 1944 over 100,000 Soldiers of the US Sixth Army assaulted the beaches of Leyte Island in the Philippines. Often overlooked in the armada of over 700 ships were five little vessels specially designed to provide communications capabilities for Army commanders during the invasion. This little fleet within a fleet existed because of innovative Signal Corps officers who sought to solve the challenges of communicating between the ground, air and sea domains.

Maj. Gen. Spencer B. Akin, the chief signal officer of the Southwest Pacific Area, (General MacArthur's G-6) established the Seaborne Communications Branch (SCB) on March 21, 1944 and staffed it with officers with maritime backgrounds and technical understanding about communications during amphibious operations. The SCB acquired and equipped several vessels to serve as floating command posts during am-

phibious operations.

Akin organized Signal capability in the sea domain for the operation. He stationed himself aboard Patrol Craft Escort (PCE) 848 along with a small staff to handle Gen. MacArthur's personal messages, a special VHF team to operate eventual land links, and a team to intercept Filipino guerrilla and Japanese broadcasts. The other SWPA HQ craft – PCE 849 – carried the Assistant Theater CSO, Lieut. Col. Benjamin H. Pochyla and staff plus an intercept team of Filipino Scouts and US Army code clerks. The remaining CP ship, PCE 850, carried Sixth Army Signal staff officers. In addition, two former commercial vessels served as platforms for support of news media personnel. The broadcast vessel Apache had been augmented with additional public relations officers and enlisted men to operate the recording equipment installed on the ship. The other vessel, FP 47, carried four public relations officers and two war correspondents.

During the operation, PCE 848 handled over 10,000 words per day. PCE 849 served primarily as a monitor ship and a standby in case of trouble on the 848 and to handle overflow traffic. Meanwhile PCE 850s powerful equipment operated within Sixth Army nets, particularly the command net, as a relay for army, corps and other units who could not communicate directly with each other and handled over 25,000 words in a single day. By Day (D) +2, ship-to-shore communications were fully operational and transmitted teletype and voice communications directly from the beachhead to any base in the theater.

PCE 848
Courtesy photo

Though the technical challenges of communications had been overcome, there was still an enemy threat as the Japanese still possessed the capability to contest the invasion. When the Japanese fleet began their counter-attack on Oct. 23 they lured the US Third Fleet, away from Leyte Gulf which exposed the troopships, transports and other non-combat ships to air attacks, to include the first organized use of the Kamikaze units. Japanese air attacks began with an estimated 150-200 planes, mostly twin-engine bombers. Just after 8:30 a.m. on October 24th, PCE 849 shot at an attacking Japanese bomber and claimed a probable destruction of the plane. The next day saw several waves of enemy bombers, who according to the commander of PCE 849, "were coming at us from all sides." Signal Corps men crewed the .50 caliber guns and one naval officer said, "They are absolutely unflinching. I have seen them staying at their posts without showing a sign of fear when Jap planes were coming right at their guns." By the time the Leyte operation had ended, the PCE 849 had experienced 70 air raids and shot down three Japanese planes.

The success of the Signal corps CP fleet continued during the invasion of Luzon in January 1945 where again the Signal Corps CP fleet was relied upon to ensure uninterrupted communications during Army level operations to extend communications capability from the sea to the foxhole. The service of the CP fleet culminated in Tokyo Bay on Sept. 2, 1945 where several of the ships were witness to the formal surrender ceremony that ended WWII.

The Most Important Message – Cease Fire August 1945

During the last hours of WWII, signalers at Headquarters, US Army Forces, Pacific in Manila, played a key role in a radio drama that brought an end to the war. Through Swiss diplomats, the Japanese government agreed to surrender and be subject to orders of the Allied Supreme Commander, General Douglas MacArthur. However, diplo-

matic words had to be transformed into action to stop the death and destruction throughout thousands of miles of Pacific and Asian battlefields and oceans.

At 9 am Manila Time on August 15, 1945, the Signal officer in charge of the teletype room read a stunning in the clear message for MacArthur from the War Department that stated, “YOU ARE HEREBY OFFICIALLY NOTIFIED OF JAPANESE CAPITUALION. YOUR DIRECTIVE AS SUPREME COMMANDER FOR THE ALLIED POWERS IS EFFECTIVE.” At that point, the circuit failed and the OIC and operator froze in disbelief. A moment later, the teletype started again, repeating the message, followed by instructions for MacArthur to contact Tokyo to coordinate an immediate cease-fire. Knowing the urgency to stop further bloodshed, signalers throughout the Pacific theater and in Washington made extraordinary efforts to establish communications with Japan on any frequency - meteorological, financial, military, or civilian - to get MacArthur’s message through. The office of the Chief Signal Officer in Washington relayed the message to commercial radio companies such as RCA and CBS; as well as neutral foreign capitals such as Berne, Switzerland; Stockholm Sweden; and Madrid, Spain.

The Signalers at station WTA in sweltering hot Manila were drenched in sweat having been at their teletype keys or radio earphones during 10 hours of frantic effort to contact a Japanese station. Finally, a commercial station, KER in San Francisco, got the attention of Japanese station JUM who responded, “GO AHEAD. SEND 40 WORDS PER MINUTE.” The Signalers in Manila had monitored the transmission and shortly after, JUM was directed to talk to WTA in Manila. Suddenly messages began to pour into the Signal Center as stations everywhere had been listening in on one of the greatest radio dramas in history and they wanted to make sure WTA had heard the response. With the circuit established, important messages began to flow between MacArthur and the Japanese government. On August 16, the Japanese government sent word, “HIS MAJESTY THE EMPEROR ISSUED AN IMPERIAL ORDER AT 1600 O’CLOCK ON AUGUST 16TH TO THE ENTIRE ARMED FORCES TO CEASE HOSTILITIES IMMEDIATELY.” The message that ended World War 2 had gotten through and US Army Signal Corps personnel and equipment had made it all happen. **Victory!**

During WWII the Signal Corps installed, operated, and maintained communications equipment for the Army's ground forces and the Army Air Forces. Gen. Omar Bradley, commander of the 12th Army Group, offered an assessment of communications by referring to his telephone system as, “the most valued accessory of all.” He said, “From my desk in Luxembourg I was never more than 30 seconds by phone from any of the armies. If necessary, I could have called every division on the line. Signal Corps officers like to remind us that ‘although Congress can make a general, it takes communications to make him a commander.’”


THE STARS AND STRIPES

WAR ENDS

Truman Announces Total Surrender

WASHINGTON, Aug. 15 (AP)—The United States, Britain, Russia and China announced today that Japan had surrendered unconditionally.

The job of disarming millions of Japanese soldiers still had to be accomplished, but it seemed that peace had returned to the world for the first time since 1937, when Japan invaded central China.

President Truman, who announced the surrender for the U. S. at 7 p. m., EWT (1. a. m., Central European Time), revealed that Gen. Douglas MacArthur had been named Supreme Commander in charge of occupation forces and would receive the surrender. Mr. Truman started his dramatic announcement by

Front Page of Stars & Stripes newspaper announcing the end of World War II
Courtesy photo

Cold War Communications (1946-1989)

Steven J. Rauch
Signal Corps Branch Historian

Following World War II the Signal Corps shrank from 350,000 personnel to an active strength of about 50,000. However increasing tensions with the Soviet Union and Communist China gave rise to the Cold War and the threat of Atomic warfare. On occasion the Cold War heated up during the Korean War, Cuban Missile Crisis, and Vietnam War…Following withdrawal from Vietnam the Army reorganization included relocating the Signal School from Fort Monmouth and consolidated training at Fort Gordon, Georgia. During the 1980s the Signal Corps focused on its role in supporting the Air Land Battle doctrine to oppose the Warsaw Pact in Europe. This doctrine required a completely new family of tactical communications technology known as Mobile Subscriber Equipment, or MSE. Beginning with the implementation of the U.S. Army Regimental System in 1986, the commandant of the U.S. Army Signal School was also designated as the Chief of Signal and the branch proponent for all Signal Soldiers and organizations in the US Army.

1st Sgt. Percy D. Ricks, Jr.
Courtesy photo

Beyond the Earth – Project Diana

This post-war drawdown did not curtail the Corps' scientific studies. The Signal Corps soon found itself breaking ground into a new domain of warfare – the space domain to leverage outer-space for communication, particularly satellite platforms to extend the reach of military communications. On January 10, 1946, Signal Corps scientists, using a modified SCR-271 long range radar antenna succeeded in bouncing radar signals off the moon. Project Diana, named for the Roman goddess of the moon, demonstrated that very high frequency radio waves could penetrate the ionosphere encircling the earth and into space. After Project Diana, the Signal Corps broadened its space domain activities and participated in postwar atomic bomb tests. In 1949, the Signal Corps provided electronic support for guided missiles, an effort which grew into the United States Army Signal Missile Support Agency.

On March 17, 1958, a Vanguard rocket carried a satellite powered by solar cells developed by the Signal Corps Research and Development Laboratory at Fort Monmouth. The first communications satellite, Project SCORE (Signal Communications via Orbiting Relay Equipment), launched 18 December 1958 carried a Signal Corps-developed communications package. SCORE demonstrated that multiple voice and teletypewriter signals could be received, stored, and then retransmitted by an orbiting satellite. The Signal Corps mission for developing satellite payloads ended in 1962 when the Army formed the Satellite Communications Agency, but that was only the beginning of using these platforms for warfare.

An Integrated Army – 1st Sgt. Percy D. Ricks, Jr.

In June 1946, Percy D. Ricks, Jr. became the first African-American to serve as First Sergeant of a racially integrated unit at the Signal Corps Photographic Center

(SCPC), Astoria Studios, Long Island City, New York. During WWII, Ricks served in a transportation unit where he supervised the shipment of supplies from the ports to the front. Following VE Day, Ricks was discharged from the Army but quickly reenlisted into the Signal Corps. He was assigned to the Signal Corps Photographic Center where he served as First Sergeant for the 9440th Technical Support Unit. This action occurred two years before President Truman signed Executive Order 9981 that ended segregation of the Armed Services.

In 1953, Ricks was assigned to the 304th Signal battalion in Korea where he was the NCOIC of the Photo Platoon. He returned to the SCPC in 1957 where he became chief of quality control. Ricks final assignment was as the lab representative where he coordinated with motion picture industry and commercial manufacturers for the growing use of color photography. This milestone was just one of many during the life of a “man of quiet dignity” who was dedicated to serving his nation and the military profession.

Cold War Turns Hot - The Korean Conflict 1950-1953

Under the leadership of Maj. Gen. George I. Back, the Signal Corps underwent another wartime expansion when North Korea invaded South Korea in June 1950. The US Army had to quickly adjust from their peacetime duties in occupied Japan to immediate combat operations. Signal Corps officers and Soldiers soon found themselves in the thick of combat operations, having to improvise and make do with WWII legacy communications equipment. One such unit was the 24th Signal Company, 24th Infantry Division, the first US combat unit into Korea to help the Republic of Korea Army halt the communist advance to the port of Pusan. Throughout July and August 1950, the 24th ID conducted a delaying action to slow the NKPA long enough to enable the US 8th Army to marshal forces to form the Pusan Perimeter defense line. Signalers were needed to operate communications from Japan to Korea. Signal units like the 8035th Signal Service Company established the Eighth Army's communications system and connected it with the Far East Command's (FEC) Signal troops operating in Japan. But, the nature of warfare in a mountainous Asian country proved different when Signal Soldiers learned they had to fight as infantry in order to preserve communications and their lives. One infantryman commented, "Here they [the enemy] are shooting all over, and those crazy Signal Joes are going on laying lines like nothin's happening."

The mountainous terrain and inadequate roads restricted the use of wire and telephone circuits. The rugged hills hampered radio relay teams and relay trucks were targets of guerilla warfare and sabotage. One solution was use of very high frequency (VHF) radio which was more dependable than wire as the primary method of communication. One Signaler believed VHF was the backbone of the communications network and was “so flexible that it could keep up with the infantry in the rapid moves that characterized the fighting in 1950-1951." VHF operated using line of sight which required the equipment be positioned on high terrain and could provide communications over mountains, across rivers, and ship to shore. VHF radio communications in Korea often surpassed expectations. For example, the 304th Signal Battalion used AN/GRC-3 and AN/GRC-4 sets at ranges beyond the twenty-five mile line of sight specifications.

Replica of Vanguard 1 Satellite circa 1958
Courtesy photo

The Atomic Battlefield

The doctrine of nuclear warfare required a command control system that could cover an extended

and dispersed battlefield. Any system had to be highly reliable, have redundant capability and enable rapid communications to all units regardless of their wide dispersion. The Signal Corps had to abandon the more traditional single axis method of communications as in the event of an atomic attack and destruction of any signal center on the axis, communications would be completely severed. In response, the Signal Corps developed the Army Area Communications System (AACS). The AACS featured mobility, self-containment, alternate routing capability, and broad coverage to widely dispersed units. This system provided a reliable multi-axis and multichannel network which increased assurance of command control on potential atomic battlefields of the future.

1962 Army Reorganization

The growing authority of the Department of Defense reached a critical point Robert S. McNamara was appointed Secretary of Defense. In 1962 McNamara directed a complete reorganization of the Army that included the break up the stovepiped technical services, including Signal Corps. This reorganization placed the Chief Signal Officer under the staff supervision of the Deputy Chief of Staff for Operations (DCSOPS). The Chief Signal Officer title was discontinued and became the Chief of Communications-Electronics and no longer held duties as branch proponent for the Signal Corps. The functions of training, equipment, doctrine, and operations were divided between different major commands. Almost immediately frustrated signal officers voiced their view that the Army Staff lacked “a proper understanding of Army communications and electronics and the role of the Chief Signal Officer.” The actual signal missions were to be performed by signal units under tactical commanders at corps and below or in the case of strategic communications, the newly established Strategic Communications Command (STRATCOM).

Billboard antennas
Courtesy photo

A New War - Vietnam

As early as 1950 the Signal Corps sent advisors to Vietnam to establish an Army Command and Administrative Network (ACAN) station in Saigon. After the French withdrew from Indochina, a US advisory group remained to assist the South Vietnamese and signal advisors were assigned to each of the country’s military regions to provide training and other support.

One of those advisors was Master Sgt. Kenneth M. Roraback, who distinguished himself on November 24, 1963, when a large Viet Cong force attacked a Special Forces Camp at Hiep Hoa, Republic of Vietnam. Working in the radio room, he notified higher headquarters of the situation before heavy enemy fire damaged his equipment. Roraback remained at his station and attempted to repair his radio. When it became apparent that this was not possible, he destroyed what was left of the equipment, maneuvered through hostile fire, and manned a light machinegun to cover the withdrawal of friendly forces as long as he could until captured by the Viet Cong.

Roraback adhered to the Code of Conduct and proved defiant and verbally combative with his captors. These acts brought harsher treatment upon him. On Sunday, September 28, 1965, "Liberation Radio" announced the execution of Kenneth Roraback in retaliation for the deaths of three terrorists by South Vietnamese officials.

The technical proficiency of Master Sgt. Ken Roraback personifies the training and dedication of the American combat communicator.

Communications in Vietnam

By 1960, a private firm began building a 7,800 mile tropospheric scatter system from Hawaii to the Philippines. From there the ACAN system made the final jump to Indochina where troposcatter equipment in South Vietnam provided the backbone of a strategic signal network called BACKPORCH. The system used large billboard type relay antennas and by September 1962, installation was completed and turned over to the 39th Signal Battalion for operations. Scatter worked by bouncing radios beams off layers of the atmosphere, which reflected them back to earth. To provide command and control for Signal operations in Vietnam, the 1st Signal Brigade from the US Army Strategic Communications Command served as headquarters for more than 23,000 soldiers and became the largest signal organization ever deployed, with six Signal groups and twenty-two Signal battalions.

AN/PRC-25 transistorized radio
Courtesy photo

During the Vietnam War, the Signal Corps validated the use of satellites for providing integrated communications between land, sea, air and space domains. In August 1964, Signal Soldiers led by Warrant Officer Jack H. Inman established an experimental satellite ground station with one telephone and one teletype circuit to provide communications services between Saigon and Hawaii through a communications satellite 22,000 miles above the Pacific Ocean. This synchronous communications satellite system, named SYNCOM, was the first use of satellite communications in support of ongoing military operations. By October 1964, an upgraded SYNCOM provided one telephone and sixteen message circuits and proved that space-enabled communications could provide commanders with reliable and extended communications.

In 1966, Gen. William C. Westmoreland, commander of Military Assistance Command, Vietnam (MACV), remarked, “The communications system…has responded brilliantly. No combat operation has been limited by lack of communications. The ingenuity, dedication, and professionalism of the communications personnel are deserving of the highest praise." ***TET and Vietnamization***

During the celebration of the lunar New Year, known as Tet, in January 1968, the North Vietnamese and the Viet Cong launched a general offensive hoping to defeat the United States. During TET many signal sites came under attack and signal troops suffered hundreds of casualties defending their positions, proving they could both shoot and communicate. While the communists did not achieve the decisive victory they had anticipated, it fueled antiwar sentiment back in the United States.

When President Richard M. Nixon took office in 1969 he directed significant troop withdrawals and implemented “Vietnamization” where the Army conducted an extensive training and modernization program for the South Vietnamese Army. Within 1st Signal Brigade, the “Buddies Together” program matched American Signal units with their South Vietnamese counterparts to help prepare them to take over operation of the fixed-communications system.

As the war closed the 1st Signal Brigade decreased in size to less than 2,500 men. In the cease-fire agreement of January 1973, the US agreed to terminate all direct military support to South Vietnam. The 39th Signal Battalion, the first Signal unit to arrive in Vietnam, became the last to leave, and departed in March 1973. Although Vietnam was a highly controversial war, it demonstrated the extraordinary communi-

cation capabilities of the U.S. Army.

Post-Vietnam Rebuilding and Air Land Battle

In July 1973 the Army placed all of its branch schools under the newly created Training and Doctrine Command (TRADOC). The Army decided to consolidate its signal training at one installation and on October 1, 1974, Fort Gordon, Georgia became the U.S. Army Signal Center and Fort Gordon, the new “home of the Signal Corps.”

In response to the growing Soviet threat, the United States began a massive military buildup. Improving and strengthening the Army's capability to command and control comprised a fundamental requirement of the new Air Land battle doctrine. This included modernization of communications systems at division and corps level leading the Army to adopt a new tactical communications architecture known as Mobile Subscriber Equipment, or MSE. At battalion level and below, the Army introduced new VHF-FM combat net radios, the Single Channel Ground and Airborne Radio System (SINCGARS).

MSE was first field in February 1988 to the 13th Signal Battalion, 1st Cavalry Division. As one signalman described it, "MSE is the equivalent of an advanced telephone system with stationary telephones and mobile radio terminals, as well as facsimile devices and the capability to accommodate data terminals." By dialing a phone number using fixed directory numbers, the MSE system automatically located the party on the battlefield and connected the call. In the event of damaged or busy systems, MSE redirected the call using search routing. Other features of the system included user owned and operated facsimile and data terminals, call forwarding, digital non-secure voice terminal telephones for static users, and mobile subscriber radiotelephone for mobile users.

In May 1989, the Signal Center opened the new Mobile Subscriber Equipment Resident School. The first three classes offered were the Nodal Operations Management Course, the Transmission Systems Operator course, and the Network Switching Systems Operator course. During 1989, over 500 students trained at the MSE and the number doubled to over 1,000 in 1990.

The US Army Signal Regiment

To improve unit cohesion and esprit, Army Chief of Staff Gen. Edward C. Meyer approved implementation of the United States Army Regimental System in 1981. As originally conceived, Soldiers would affiliate with specific regiments for the duration of their military careers. Within the combat support/combat service support branches, the system was implemented as a “whole branch” regiment, where personnel of the Signal Corps were assigned to the Signal Corps regiment. In June 1986 Fort Gordon was designated as the home of the Signal Regiment and the commanding general of the Signal Center became the Chief of Signal, thereby reviving the position of branch chief that had been lost in the 1962 reorganization.

MSE Shelter
Courtesy photo

The Information Mission Area

The steadily evolving marriage of automation (computer) systems and communications systems led the Army to designate the Signal Corps as proponent for the Information Mission Area (IMA). This included responsibility for integrating IMA doctrine, organization, training, materiel and leadership for the five IMA disciplines: communications, automation, visual information, records management and printing/publications. This decision soon resulted in renaming everything “communications” to “information” across the

Army. The Army Communications Command became the Army Information Systems Command and at the DA level, the Assistant Deputy Chief of Staff for Operations and Plans (Command, Control, Communications, and Computers) became the Assistant Chief of Staff for Information Management.

A significant aspect of IMA was on June 16, 1987. The TRADOC commander directed the Army's Computer Science School at Fort Ben Harrison be relocated to Fort Gordon. Since the desktop computer was expanding beyond its original concept as a more effective typewriter into a device able to communicate with other computers via a network, the Army sought to leverage the development by co-locating automation and communications into an integrated training environment.

Courses conducted at the Signal School were designed to expose students to Tier I – III architecture, from micro, mini and mainframe computers as well as local area networks (LAN), data communications, and UNIX. Artificial intelligence (AI) and automation data processing were also added to the curriculum. The goal was to provide Signal soldiers with technical skills to operate the IMA arena and keep pace with accelerating technology. On October 28, 1988, the Computer Science School was officially activated as part of the US Army Signal Center.

Especially perplexing was the responsibility for records management and printing/publications on the battlefield, which traditionally had been performed by the Adjutant General Corps. This issue of records management remained unresolved for some time as the Signal Corps began to implement doctrine that increased the user's obligation to implement their own information systems and services, including installing, operating and maintaining their own terminal equipment.

Visual information (VI) on the battlefield was categorized as COMCAM and Functional VI. COMCAM was performed by Signal units organic to the theater Signal command. Units, such as psychological operations, medical and public affairs, owned and operated their own VI equipment and systems in support of battlefield operations.

End of the Cold War

In November 1989 the unthinkable happened: the Berlin Wall came down and the borders were opened for East European nations that for so long been adversaries of NATO and the US. This tectonic shift in the geo-political world changed almost overnight US military posture and strategy. Two years later saw the unexpected economic and political collapse of the Soviet Union, which had been weakened by a prolonged campaign in Afghanistan and growing unrest of people long denied freedom. Soviet leader Mikhail Gorbachev championed *glasnost* (openness) and *perestroika* (restructuring) which led to discussions with the West about the limitations of arms and force reductions between the Warsaw Pact and NATO. With the changed geo-political environment, the US began to reconsider its military forces as it tried to ensure it was ready for a future war with an unknown enemy with unknown capabilities.

Combat Cameraman documents the invasion of Panama in December 1989
Courtesy photo

Signal in the Information Age (1990-2000)

Steven J. Rauch
Signal Corps Branch Historian

Rapid advances in computer technology brought forth the Information Age during the 1990s. When the US went to war with Iraq in 1990-1991 instead of miles of wire, arrays of antennas and satellite dishes dotted the desert landscape. Though short in duration, DESERT SHIELD/DESERT STORM showcased the extent to which military communications had entered the digital era and the success of MSE. The end of the twentieth century saw the United States engaged in humanitarian efforts in diverse environments such as Northern Iraq and Turkey, Somalia, and Haiti. After 1995 the Army became focused on stabilization operations in the former Yugoslavian Republic states of Kosovo, Bosnia-Herzegovina and Croatia. During this period the Signal Corps gained more relevance due to some of the most significant technological advances in communications history.

JUST CAUSE – Panama 1989-1990

Since the building of the Panama Canal the US had maintained a military presence in that country. When Gen. Manuel Noriega rose to power, tensions between the US and Panama had intensified where several Americans were killed and injured in various acts of violence. To protect American lives, uphold the Panama Canal treaties, and restore democracy to the country, the United States conducted a quick military strike called JUST CAUSE on December 20, 1989. Its success stemmed in part from the close integration of Signal planners who developed joint communications-electronics operating instructions (JCEOI) and leveraged interoperability between services. The Signal Corps used man-portable tactical satellite radios that operated on a single-channel however the signals could be easily detected and jammed, thus limiting their usefulness. By January 31, 1990, the US had captured Noriega, stabilized Panama, and withdrew its forces.

DESERT SHIELD 1990 – Theater Level Signal Challenges

The mission for managing information technology saw its first test during Operations Desert Shield/Desert Storm in 1990-1991 in the sands of Saudi Arabia, Kuwait and Iraq. In addition to its traditional role of providing communications via radio, telephone and satellite this was a test for information transfer in the form of data, such as personnel, financial and logistics information via automation technology such as desktop computers. This nascent information network also included the first in theater email system, which allowed deployed Soldiers to communicate with family members, thus linking commercial and military systems, which could handle up to 15,000 email messages a day. The first stage of the communications campaign involved supporting the logistical buildup for Operation DESERT SHIELD where the 11th Signal Brigade installed a state-of-the-art communications network in Saudi Arabia. In the featureless desert, satellite communications proved essential as they provided information about weather, terrain, and the Global Positioning System

Operation Desert Shield begins
Courtesy photo

(GPS) network which made navigation possible.

The communications campaign moved into the next stage with the activation of the 6th Signal Command (Theater) (Provisional) to manage the communications network for ARCENT. The 6th Signal Command assumed responsibility for all of the echelon above corps (EAC) Signal assets in the theater that came to include one Signal brigade, five Signal battalions, a communications-electronics maintenance company and a light troposphere company. Transmission links included tropo-scatter, satellite, line-of-sight and cable to link into the tactical communications of the XVIII Airborne Corps and the VII Corps.

One of the major challenges of Signal operations at this level was proper communications planning. The Joint Communications Electronic Operating Instructions (JCEOI) were not issued until January 1991, over four months after troops had been deployed. Other challenges included need for more trained TRITAC/DGM personnel, contractor maintenance support, and precedence abuse.

To conduct initial defensive

Soldiers from the 6th Signal Brigade
Courtesy photo

operations during DESERT SHIELD, the Army deployed the XVIII Airborne Corps, supported by the 35th Signal Brigade. The 35th's mission was to support the four and two-thirds divisions of the Corps as they defended key ports and oil producing facilities in Saudi Arabia. Because the corps had mechanized, light infantry, and air assault infantry units, the 35th Signal Bde faced unique communications challenges. The Corps Commander, Lt. Gen. Gary E. Luck remarked, "I am a big believer in the Signal Corps, always have been. It was a crucial part of our business in Southwest Asia, and it worked perfectly."

DESERT STORM 1991 – Triumph of MSE

When VII Corps began deploying from Germany in November 1991 two things became clear. The Cold War in Europe was really over, and operations in the gulf were

about to transition into an offensive phase. Supporting VII Corps was the 93rd Signal Brigade which deployed 1,700 items of equipment and 2,500 soldiers who would eventually install a network over 75,000 square kilometers.

One of the most challenging aspects of deployment was the unsynchronized flow of equipment that resulted in the degradation of the ability to provide network services. Another challenge was the different generations of signal equipment that needed to interface with each other. According to one signal officer, "The thirst for communications could not be supported." The VII Corps had two MSE equipped divisions and two with IATACS (AN/TRC-145 and AN/TTC-41) equipment. In addition, the British 1st Armored Division had to be integrated into the US structure, leading another signaler to state, "whatever works is doctrine."

When offensive operations began on February 24, the true test of the signal network began. At the division level, the 143rd Signal battalion provided the 3rd Armored Division a well planned and executed support plan for using MSE. It designed a two node base and a chain of node centers 30 kilometers apart along the axis of advance, a distance of over 150 kilometers. This "daisy chain" method was used for the movement to contact upon which the 143rd would revert to its normal MSE configuration. Plans however changed rapidly as the attack began 13 hours earlier than planned, challenging the division signalers to keep up with the forward brigades. To add pressure, the Corps Commander, Lt. Gen. Franks spent a lot of time in the division's TAC but was able to maintain contact with ARCENT throughout the advance. Frank's later stated, "3rd Armored Division had the best communications in the Corps." MSE had been proven and the Signal Corps had performed admirably, prompting Maj. Gen. Paul E. Funk, CG of 3AD to say, "During Operation Desert Storm, the division Signalers truly earned their combat pay."

J-STARS wide-area surveillance system developed by the Army and the Air Force
Courtesy photo

Revolution in Military Affairs and Digitization

Though DESERT STORM was a resounding success, it merely validated the Air Land Battle doctrine and organization that had been designed to fight an enemy who no longer existed. As the nation underwent ad economic recession in the early 1990s, there was pressure to obtain a "peace dividend" by reducing the Army's force structure from sixteen divisions to ten. Army doctrine shifted toward projecting power from US bases, rather than maintaining large overseas forces.

The Army began transforming into smaller, lighter, and more agile forces. It was widely believed that by leveraging the latest digital and micro-chip technology, particularly communications technology, the reduction in personnel and organizations could be achieved. The result was Force XXI, a program to digitize the tactical force The 4th Infantry Division at Fort Hood, Texas, became the test bed for experiments using digital technology with of goal of obtaining information dominance over future

adversaries. Digitization would also enable joint operations and the Army participated in fielding the Secret Internet Protocol Router Network (SIPRNET), a classified network similar to the Internet for exchanging operational plans and information. The Non-Secure Internet Protocol Router Network (NIPRNET) was used to exchange less sensitive information. Together with the Joint Worldwide Intelligence Communications System (JWICS), these networks comprised the Defense Information Systems Network (DISN).

Contingency Operations and Humanitarian Support

Crises in several regions during the early-1990s required intervention by American forces to save lives. The largest of these were Operation PROVIDE COMFORT in northern Iraq and southern Turkey, where US and coalition forces provided aid to Kurdish refugees driven from their homes by Saddam Hussein. In Somalia, the United States conducted Operations PROVIDE RELIEF and RESTORE HOPE in 1992, to help victims of famine caused by a devastating drought. In September 1994, US troops deployed to Haiti to restore a democratically elected president to power an operation known as UPHOLD DEMOCRACY. At home signal units responded to a series of natural disasters including Hurricane Andrew in Florida and Louisiana in August 1992 and Hurricane Iniki in Hawaii the following month.

Enhanced Position Location Reporting System
Courtesy photo

The Balkan Quagmire

One concern from Desert Storm was the avoidance of friendly fire, as several casualties had been caused by fratricide. To help address this issue technology called Blue Force Tracking (BFT) allowed commanders nearly real-time situational awareness and the ability to view the disposition of friendly forces on a computer screen. BFT improved upon the GPS available during DESERT SHIELD/STORM. In addition to friendly locations, BFT provided soldiers with information on terrain and danger zones, such as mine fields.

Other equipment included the Enhanced Position Location Reporting System (EPLRS). EPLRS became a critical component of the Army's tactical signal network and could be carried on a Soldier's back, mounted in vehicles, or installed in aircraft. Its automatic relaying capability extended the radio's range. It also had the ability to store up to 10 messages. Because EPLRS was compatible with sets used by the other services, interoperability was achieved.

The United States faced an uncomfortable geopolitical world generated a series of unforeseen crisis's that threatened worldwide peace and stability. In Eastern Europe long-suppressed rivalries between ethnic groups in the former Yugoslavia grew as the totalitarian state disintegrated. Between 1991 and 1992, four of the nation's six republics declared independence: Slovenia, Croatia, Macedonia, and Bosnia-Herzegovina. The most violence occurred in Bosnia-Herzegovina, an area with a Muslim majority where a campaign of "ethnic cleansing" began. The United States joined other members of NATO to enforce peace accords signed at Dayton, Ohio, in the fall of 1995.

In a land ravaged by years of civil war, the US Army's Signal units proved essential to the restoration of communications when the U.S. deployed a stabilization force. Although US Army Signal units did not participate in large numbers, Signal Soldiers nevertheless supplied critical communications infrastructure.

Supporting the 21st Century Army (2001-Present)

Steven J. Rauch
Signal Corps Branch Historian

A New Century – A New War

The unthinkable occurred when terrorists attacked the United States on September 11, 2001. One of the lessons learned from the response to this attack was the poor state of emergency communications within the United States. Interoperability was not just a military problem - it extended to the civilian realm as well. The Signal Corps quickly found their capability and expertise in demand. One signal non-commissioned officer (NCO) working in the White House Communications Agency stated, "It seemed like the switchboard just caught on fire, all the phones just started to ring at once….Our NCOIC had come in to the switchboard to help the supervisor out because he was talking on three different phones at once. For many departments of the Government 9-11 was a wakeup call. It was our job to ensure their procedures were equal to our standards and that department heads and cabinet members could communicate to the White House."

In the aftermath of 9/11, the United States embarked on what became known as the War on Terrorism. Al Qaeda, an Islamic extremist group, organized the September 2001 attacks. Its leader, Osama bin Laden, had a base of operations in Afghanistan, where the repressive Taliban regime helped shelter terrorist training camps.

ENDURING FREEDOM - Afghanistan

An American air and missile campaign against the Taliban began on October 7, 2001, marking the start of Operation ENDURING FREEDOM (OEF). It was followed by the insertion of Joint Special Operating Forces teams who joined forces with the loosely organized Northern Alliance. Not only was the topography of Afghanistan challenging, the country had little existing communications infrastructure. Because line of sight signaling was severely hampered by the rugged landscape, satellite-based communication was essential.

Elements of the 11th Signal Brigade deployed to the region in November 2001 to install satellite terminals, data networks, and other necessary equipment. The urgency of the mission was reflected by an NCO from the 54th Signal Battalion who stated, "I prepared two TACSAT teams for the mission. Without knowing what they were to expect once they got there, we prepared our teams the best we could with what little information we were given. Looking back, the only thing we did not take into account was that the climate in Afghanistan was a lot different…Our teams were sent with very little cold weather gear, and since Camp Doha

Aftermath of terrorist attack on World Trade Center, New York City
Courtesy photo

had none to send, we had to ship it to our teams from the States." The success of Operation ANACONDA in March 2002 led to the collapse of organized Taliban resistance. Most of its forces dispersed into the mountains on the Afghanistan and Pakistan border. By eluding capture, they could return to fight another day.

IRAQI FREEDOM

The victory in Afghanistan was followed by further military operations against terrorism. Iraqi dictator Saddam Hussein's ties to international terrorism represented a continuing threat to the stability of the Middle East. In March 2003 the United States, with support from Great Britain, invaded Iraq in what was named Operation IRAQI FREEDOM (OIF). American ground forces, aided by precision air strikes, advanced toward Baghdad.

For Signal Soldiers, the focus was on moving, survival and providing uninterrupted communications to combat soldiers. Weather also posed challenges to communications. An Armor battalion S-6 recounted, "Distance was not our enemy; sand storms were devastating at times without the use of RETRANS in place. During the battle of the Al Kifl Bridge on March 24 through March 27, 2003, the sand storms were so fierce that our FM communications capabilities were decreased to eight kilometers using our power amplifiers." One NCO from the 123rd Signal Battalion recalled, "Many times during the initial push I thought that I just might die but we pushed on and we all survived…Our mission was to supply the DTAC (Division Tactical Headquarters) element with flawless Line of Sight and Satellite communications…It really gave me a sense of purpose to know that our brothers and sisters on the battle field were counting on us in order for them to communicate." By April 7, the 3d Infantry Division had captured Baghdad and the Signal soldiers of the division had played a critical part in that success.

Lessons Learned – Joint Network Node (JNN)

Operation IRAQI FREEDOM provided important lessons for the Signal Corps. From Desert Shield/Storm, Signal Soldiers understood that environmental factors such as heat, sand, and high winds would present challenges for communications equipment. During OIF they discovered that MSE and TRI-TAC equipment that relied on terrestrial radio relay could not keep pace with fast-moving forces operating over huge distances. Moreover, the voice switch network could not handle the huge amounts of digital data being transmitted.

To overcome these obstacles, the Army quickly developed and fielded the Joint Network Node (JNN) system into its architecture to provide needed satellite links and data transport. The JNN was mounted inside of a shelter mounted on a HMMV and included a series of routers, call-managers, a media converter, TACLAN, and encryption devices to provide secure and non-secure voice and data capabilities. The data was transmitted through a KU band satellite, standard issue with JNNs and the Command Post Node (CPN), or via line of sight (LOS). The CPN is a smaller package of the JNN equipment and used at battalion or lower levels. This system allowed units such as an infantry company at an outlying site to now make phone calls via voice over internet protocol (VOIP) and send emails through the use of their CPN, connected to the JNN via the KU satellite link. As one Signal warrant officer remarked, "The move from MSE to JNTC was equivalent to graduating kindergarten and going straight to college. The lack of knowledge was not just in operating the

Joint Network Node shelter
Courtesy photo

equipment, but understanding the architecture. Even I, who should be the technical expert, had difficulties in grasping some of the concepts."

Transformation during Wartime – Division and Below

In 1999 Army Chief of Staff Gen. Erik K. Shinseki had initiated transformation of the Army's force structure to convert it into a lighter, more agile, brigade-based organization. This approach allowed it to tailor its units to fit the mission rather than adhere to a fixed organizational model, such as a division. In fact, the brigades would contain combat, combat support and combat support capability that had once been held at division level. This concept would evolve into "modularity" or the modular brigade combat team.

For the Signal Corps, the transition to "modular" units resulted in significant changes. The traditional division signal battalion was inactivated and the signal companies were incorporated into the new brigade special troop's battalion (BSTB). Newly created maneuver enhancement brigades included an embedded signal company as did some sustainment brigades. Signal companies were also placed within the new battlefield surveillance brigades.

The first division to convert to the new "modular" organizational concept was the 3d Infantry Division. It underwent transformation in 2003 after its first tour in Iraq during 2003. In accordance with the new modular configuration, the 123rd Signal Battalion was inactivated at Fort Stewart on March 15, 2004.

Echelons above Corps Transformation

In 2002 the Army re-designated the 9th Signal Command (Army) as the US Army Network Enterprise Technology Command/9th Army Signal Command with the authority to operate, manage, and defend the Army's "Infostructure" at the enterprise level, consisting of command, control, communications, computers, and information technology services in support of warfighting forces.

At the theater level, the Signal Corps created a new unit, the Signal Center, to perform network operations and security management. The Army activated the 2d through the 6th Signal Centers, at locations around the world during 2005 and 2006. The 7th Signal Center activated at Fort Gordon, Georgia, in 2007. A seventh center, located at Fort Belvoir, Virginia, designated the 1st Signal Center, performed similar functions at the army level and coordinated with other Army and Department of Defense agencies. These centers acted as provided regional hubs for the Army's information network and link each region with DOD's Global Information Grid (GIG), to establish a joint, integrated, and secure network. The Army's portion of the GIG, known as LandWarNet, was designed to bring voice, video, and data to tactical formations, down to the individual Soldier.

Meanwhile, EAC some signal battalions underwent a transformation to an "expeditionary" configuration. These units were capable of employing network assets to support the increasing number of medium and small command posts. While primarily a theater asset, these battalions could be employed to provide direct support to a corps, division, or a brigade combat team (BCT). Organized as modular organizations, such units could be tailored to meet specific mission requirements.

The focus on networks and LandWarNet may have lead some Army leaders to believe the name "Signal" was outdated and a more modern moniker

A Signal Soldier in theater
Courtesy photo

was needed. In 2007 the Commanding General of USAREUR sought to change the 5th Signal Command to the 5th Theater Network Command to "better reflect all the missions that the unit accomplishes in today's Army." Fortunately, the Signal Corps leadership raised enough objections about the loss of the historical term "signal" and the ambiguity of the term "network" that could be applied to non-communications systems, such as logistics or transportation. Chief of Signal Brig. Gen. Jeff Foley was able to convince the Army CIO/G6 to reject this proposal arguing that a "Signal Command" conveys both the tactical and technical skills inherent in the duties of Signal Soldiers.

Combat Camera – Documenting the War

The Signal Corps regained its historical photography mission on 16 November 1993 when the 55th Signal Company was activated at Fort George G. Meade, Maryland. Although photography had long been a Signal Corps function, the Army had not had any separate photographic companies since World War II. One NCO of the 55th explained the challenges of this unique Signal mission, "We don't get a lot of opportunity to train with the units we support down range…but we train with as many as we can to try and educate them on Combat Camera as much as possible…[We] have to come in as seamlessly as possible. And if you don't come in seamlessly, you're not going to be included on the missions. Pretty much, if you're not a battlefield asset then you're going to be a liability and you're not going to go. Point blank. I mean they're not there to babysit you."

Spc. Michael Carter, 55th Signal Co., Combat Cameraman and Silver Star recipient
Courtesy photo

This was demonstrated when one 55th Soldier, Spc. Michael Carter, received the Silver Star for heroism in Afghanistan. While attached to a Special Forces unit in the Shok Valley during April 2008, Carter helped repel an enemy ambush, rescue and evacuate the wounded, and assist with the reestablishment of communications with higher headquarters after the communications specialist was shot. For over six hours, Carter fought alongside his comrades and successfully prevented the position from being overrun. Since 2003, five of the company's members have received the Purple Heart and more than thirty have earned the Bronze Star.

Humanitarian Aid – Support to Civilian Authorities

Though deployed around the world, the Signal Corps still provided vital support at home. When Hurricane Katrina ravaged the Gulf coast in August 2005, it destroyed the communications infrastructure from telephone lines to cell phone towers. In response, the Army deployed some of its newest communications technology to the region, to include the mobile satellite terminals of the Joint Network Node (JNN). National Guard units responded to the emergency in great numbers, but were hampered by a lack of communications gear. Much of their equipment had been left behind in Iraq and Afghanistan at the end of their tours. Fortunately, by the time Katrina struck, most states had organized civil support teams that possessed satellite communications capability.

Spectrum Management

The proliferation of personal electronic devices has profoundly changed the modern battlefield. Weapons such as improvised explosive devices (IED), often detonated via cell phones, make control of the electronic spectrum a critical issue. In recognition of the

need for better bandwidth control, the Signal Corps in 2007 created a new military occupational specialty (MOS) 25E, electromagnetic spectrum manager. With competition for use of the spectrum so fierce both within and among the services, the Signal Corps has had to find ways to use it more wisely, such as with the Warfighter Information Network-Tactical (WIN-T). When completed, this network will connect units across all echelons with high-bandwidth voice, video, and data systems.

The Home of Signal and Cyber

In March 2014, the U.S. Army Signal Center of Excellence was re-designated the U.S. Army Cyber Center of Excellence and tasked to lead efforts for developing experts to dominate cyberspace operations. The Signal Corps welcomed a new brother branch into its Fort Gordon home when the Cyber Branch was activated on 4 September 2014. The Signal School was defined as the center of all things Signal and the Cyber School sought to mirror its new life along the lines of the senior branch. Shared training, shared facilities and shared professionalism have marked the early years of this relationship. However the Signal Corps was clearly the larger of the two branches and in 2018 claimed 56,880 personnel authorizations divided almost evenly between active and reserve component soldiers

Change and Continuity

Today, the Signal Corps remains an integral and important contributor to the Army's combat effectiveness in all domains of warfare. Beginning with Albert J. Myer's vision of a group of technical specialists and leaders trained to install, operate and maintain communications capabilities, the men and women of the U.S. Army Signal Corps have consistently demonstrated they have the adaptive ability to function within the myriad spheres of warfare and dominate the battle space whether on land, sea, air, space, information, or cyber domains. Every change in technology brought new challenges but more important than technology are the people – the men and women – the Soldiers and leaders – of the U.S. Army Signal Corps who have made success on the battlefields possible. Whether by Wig-Wag or WIN-T-- the men and women of the U.S. Army Signal Corps will continue ensuring that the message always gets through. Pro Patria Vigilans!

A Signal Corps Soldier erects a satellite antenna
Courtesy photo

In the next

ARMY COMMUNICATOR